Report
Project: 142609-6.4.3

1050 TAWADINA ROAD SERVICING BRIEF

Prepared for West Urban Developments
by ARCADIS/IBI GROUP

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1 INTRODUCTION

In 2011, Canada Lands Company (CLC), bought and took ownership of about 125 ha of the former CFB Rockcliffe air base site. The acquisition of the decommissioned base by CLC offers the opportunity today to reconnect this site back into the urban fabric of the City and create a highly desirable mixed-use community for approximately 10,000 residents. CLC completed a Community Design Plan (CDP) in 2015. In support of the CDP, there were numerous supporting documents including the "Former CFB Rockcliffe Master Servicing Study" (MSS), August 2015, prepared by IBI Group. That report provided a plan for provision of major infrastructure needed to support the proposed development of the Wateridge Village.

CLC plans to develop the Wateridge Village property in several phases. Phases 1A, 1B and 2B have already been constructed, which cover about 45 ha. The Phase 2B registered 4M plan is provided in **Appendix A**. This phase covers about 10 ha and includes 12 blocks. Block 11 is located in the West portion of the Wateridge Village Phase 2B and has been severed into 2 parcels. The plan showing the severed parcels is included in **Appendix A**. ARCADIS/IBI Group Professional Services Inc. (ARCADIS/IBI Group) has been retained by West Urban Developments to provide professional engineering services for Block 11, Parcel 1. The subject site is approximately 0.72 ha and consists of two 9- storey residential buildings and an amenity building, with a total of 254 units. The site also consists of below grade parking facilities. Additionally, the 1050 Tawadina M-plan and Architectural Site Plan have also been provided in **Appendix A.**

Block 11, Parcel 1 is bounded by Tawadina Road to the North, Parcel 2 to the South, Bareille-Snow Street to the West and Michael Stoqua Street to the East. Its Civic Address is 1050 Tawadina Road. Refer to key plan on **Figure 1.1** for Site location.

Figure 1.1 Site Location

The proposed servicing design conforms to current City of Ottawa and MECP design criteria, and no pre-consultation meetings were requested from the Rideau Valley Conservation Authority (RVCA) or the Ontario Ministry of Environment, Conservation and Parks (MECP).

1.1 Guidelines and Standards

This evaluation takes into consideration the City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), and the February 2014 Technical Bulletin ISDTB-2014-01, the September 2016 Technical Bulletin PIEDTB-2016-01, the June 2018 Technical Bulletin ISTB-2018-04, October 2019 Technical Bulletin 2019-01, and the July Technical Bulletin 2019-02.

It also considers the City of Ottawa Water Distribution Design Guidelines (OWDDG), and the 2010 Technical Bulletin 2010-02, the 2014 Technical Bulletin 2014-02, the 2018 Technical Bulletin 2018-02 and the 2020 Technical Bulletin 2020-02.

All specifications are as per current City of Ottawa standards and specifications, and Province of Ontario (OPSS/D) standards, specifications and drawings.

1.2 Pre-Consultation Meeting

The City of Ottawa hosted a virtual pre-consultation meeting on August 15th, 2022. Notes of the meeting are provided in **Appendix A**. There were no major engineering concerns flagged in this meeting. The City of Ottawa Servicing Study Checklist has also been included in **Appendix A**.

1.3 Environmental Issues

There are no environmental issues related to this site, as all environmental concerns were dealt with as part of the CLC's Wateridge Phase 2B subdivision approval.

The Wateridge Phase 2B Development has previously cleared and pre-graded the subject lands. There are no existing watercourses or drainage features associated with this site.

1.4 Geotechnical Concerns

Englobe Corporation was retained to prepare a geotechnical investigation for the proposed mixed use development for the 1050 Tawadina Road. The objectives of the investigation were to prepare a report to:

- Determine the subsoil and groundwater conditions at the site by means of test pits and boreholes and;
- To provide geotechnical recommendations pertaining to design of the proposed development including construction considerations.

The geotechnical report 02203079.000 was prepared by Englobe Corporation in November 2022. The report contains recommendations which include but are not limited to the following:

- Site grading;
- Foundation Design;
- Pavement Structure;
- Sewer and Watermain Construction;
- Groundwater Control;
- Grade raises

In general the grading plan for 1050 Tawadina Road adheres to the grade raise constraints noted above. A copy of the grading plans is included in **Appendix E**. The site does not pose any significant grade raise; thus a grading plan review letter is not required for this development.

2 WATER DISTRIBUTION

2.1 Existing Conditions

Phase 2B of Wateridge Village at Rockcliffe will be serviced with potable water from the City of Ottawa's Montreal Road Pressure Zone (Zone MONT). An existing 400 mm diameter watermain on Montreal Road will supply Phase 2B with connections at Codd's Road and Burma Road. As part of the Phase 1 water plan, two 400 mm mains were extended northward along Codd's Road and Wanaki Road. A copy of the existing watermain plan for Phase 2B is included in **Appendix B.**

There is an existing 400mm watermain in Tawadina Road to the north of Block 11, an existing 200mm watermain in Bareille-Snow Street to the west of the site, and an existing 200mm watermain in Michael Stoqua Street to the east of the site. In order to provide a redundant water supply to the subject site, two watermain connections are propose, one from Tawadina Road and the second at Michael Stoqua Street. Refer to the General Plan of Services included in **Appendix A** for the detailed water distribution plan for the site.

2.2 Design Criteria

2.2.1 Water Demands

The proposed development consists of 254 apartment units: 146 one-bedroom units and 108 two-bedroom units. In order to calculate water demand rates, the per unit population density and consumption rates are taken from Tables 4.1 and 4.2 of the Ottawa Design Guidelines – Water Distribution were used and are summarized as follows:

- Apartment — 1.4 person per 1-bedroom unit; 2.1 person per 2-bedroom unit
- Average Day Demand — 280 l/cap/day
- Peak Daily Demand — 700 l/cap/day
- Peak Hour Demand — 1,540 l/cap/day

A water demand calculation sheet is included in **Appendix B** and the total water demands are summarized as follows:

- Average Day — 1.48 l/s
- Maximum Day — 3.70 l/s
- Peak Hour — 8.15 l/s

2.2.2 System Pressures

The 2010 City of Ottawa Water Distribution Guidelines states that the preferred practice for the design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi).
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.

Maximum Pressure	Maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code the maximum pressure should not exceed 552 kPa (80 psi) in occupied areas. Pressure reduction controls may be required for buildings when it is not possible/feasible to maintain the system pressure below 552 kPa.

2.2.3 Fire Flow Rate

The Fire Underwriters Survey was used to determine the fire flow for the site. The calculations result in a fire flow of 10,000 l/min; a copy of the FUS calculation is included in **Appendix B**.

2.2.4 Boundary Conditions

According to the Master Servicing Study completed by IBI dated June 2020, Nodes N046 and N048 as shown in **Appendix B** – Water Distribution System: Hydraulic Modeling Results indicates the hydrant closest to the proposed connections for the site. The available fire flow for these two hydrants is also tabulated in the report. The available flow for nodes N046 and N048 at 20 psi is 26,690 L/min and 27,290 L/min as shown in Table 3-2, included in **Appendix B**, which is greater than the required domestic and fire demand of 10,000 L/min. Therefore, adequate water supply and pressure are available to serve the proposed development.

Additionally, the City of Ottawa has provided a hydraulic boundary condition at the proposed connection to the 200 mm main on Tawadina Road and 200 mm main connection on Michael-Stoqua Street. The boundary condition is based on the water demand and fire flow rates provided. A copy of the boundary conditions received November 8, 2023 is included in **Appendix B** and are summarized as follows:

BOUNDARY CONDITIONS		
SCENARIO	Connection 1 - HGL (m)	Connection 2 HGL (m)
Minimum HGL	143.0	143.0
Maximum HGL	143.0	143.0
Max Day + Fire Flow (166.7 l/s)	140.5	137.2
Max Day + Fire Flow (183.3 l/s)	141.7	137.9

2.2.5 Hydraulic Model

A computer model for the 1050 Tawadina Road water distribution system has been developed using the InfoWater SA program. The model includes the boundary conditions provided by the City of Ottawa November 2023.

2.3 Proposed Water Plan

The proposed development consists of 146 one-bedroom units and 108 two-bedroom units, equating to an estimated occupancy of 432. Two new 200 mm diameter connections will be installed to service both buildings, one connecting to the existing 400 mm diameter watermain on Tawadina Road and another connecting to the existing 200 mm diameter watermain on Michael Stoqua Street.

The site is surrounded by four existing fire hydrants, one located on Bareille-Snow Street, two on Tawadina Road, and one on Michael Stoqua Street. The hydrants are spaced less than 90 m apart, meeting the requirement of Table 4.9 of the City of Ottawa - Design Guidelines – Water Distribution, July 2010.

Calculations for fire flows using the Fire Underwriters Survey (FUS) indicate a maximum required fire flow of approximately 183.3 L/s (11,000 L/min) for Building A and approximately 166.00 L/s (10,000 L/min) for Building B, based on a non- combustible construction with a sprinkler system designed to NFPA. Since the fire flow calculation for the Building A yields a higher demand, the required fire flow for Building A will be used in subsequent calculations. Refer to **Appendix B** for detailed water demand calculations.

As per Section 2.2.1, the water demand for the proposed development is determined by the greater of the maximum day demand plus fire flow or the peak hour demand. In this instance, the maximum day demand plus fire flow demand (3.70 L/s + 183.3 L/s = 187.00 L/s = 11,220 L/min) is the governing requirement. Refer to Section 2.2.1 for the summarized water demand requirement.

According to the Master Servicing Study completed by IBI dated June 2020, Nodes N046 and N048 as shown in **Appendix B** – Water Distribution System: Hydraulic Modeling Results indicate the hydrants closest to the proposed connections for the site. The available fire flow for these two hydrants is also tabulated in the report. The available flow for nodes N046 and N048 at 20 psi is 26,690 L/min and 27,290 L/min as shown in Table 3-2, are both greater than the required domestic and fire demand of 11,000 L/min. Therefore, adequate water supply and pressure are available to serve the proposed development.

Moreover, based on the Block 11 – Parcel 1 Site Plan Submission Technical Memorandum prepared by IBI group dated November 23, 2022, the basic day pressures range from 551.6 kPa to 555.0 kPa on Tawadina Road; the peak hour pressures range between 498.8 kPa and 508.1 kPa; and the fire flows available during maximum day demand range between 462.6 L/s and 850.5 L/s. A copy of the Block 11 – Parcel 1 Site Plan Submission Technical Memorandum is included in **Appendix A**. Since the peak hour pressure exceed 276 kPa as per City's criteria and the available fire flow exceeds the required fire flow rate of 320.17 L/s, the water distribution system surrounding the proposed development is adequate to support the proposed development.

2.3.1 Summary of Hydraulic Analysis Results

Results of the hydraulic analysis for 1050 Tawadina Road are summarized as follows:

SCENARIO	EXISTING
Basic Day Pressure (kPa)	488.01 - 493.40
Peak Hour Pressure (kPa)	477.44 - 491.02
Minimum Residual Pressure (kPa) @ 166l/s	560.72
Minimum Residual Pressure (kPa) @ 183l/s	564.22

A comparison of the results and design criteria is summarized as follows:

Maximum Pressure	All nodes have basic day pressure below 552 kPa for existing conditions; therefore, pressure reducing control is not required for this site.
Minimum Pressure	All nodes exceed the minimum requirement of 276 kPa during peak hour conditions.
Fire Flow	The minimum design fire flow for Building A with a minimum residual pressure of 140 kPa in the site is 564.22 l/s which exceeds the requirement of 183 l/s (11,000 l/min). The minimum design fire flow for Building B with a minimum residual pressure of 140 kPa in the site is 560.72 l/s which exceeds the requirement of 166 l/s (10,000 l/min).

3 WASTEWATER

3.1 Existing Conditions

Canada Lands Company completed a Community Design Plan (CDP) in 2015. To support that plan, a number of technical reports were prepared including the ‘Former CFB Rockcliffe Master Servicing Study, August 2015 (MSS), which was subsequently updated in June 2020. That report recommended that the existing combined sewers on the subject site be abandoned in favour of dedicated sanitary and storm sewer systems.

In particular, the MSS recommended that future wastewater flow from Phase 2B be directed to the Codd’s Road Shaft. Accordingly, wastewater flows from the subject site will be designed to outlet to that location. The previous Phase 1A design included the new connection to that shaft and the proposed Phase 2B sanitary sewers will connect to the Phase 1B system. The sanitary sewers in Phase 2B were oversized to provide capacity for Future Phase 2C and 2D connection. A copy of Phase 2B sanitary drainage area plan and design sheet are included in **Appendix C**.

3.1.1 Verification of Existing Sanitary Sewer Capacity

An analysis was completed by IBI Group to determine the ability of the existing sanitary sewer system to accommodate the proposed development. The results of the analysis are included in the Block 11 – Parcel 1 Site Plan Submission Technical Memorandum dated November 23, 2022. Due to an increase in wastewater flows for the subject site from concepts used in Phase 2B calculations and current site plan, the proposed wastewater outlet for 1050 Tawadina is now directed to Michael-Stoqua Street. Based on the analysis provided in **Appendix C**, the wastewater flows in the Michael-Stoqua Street sewer from MH311A to MH310A is 5.20 L/s, with a spare capacity of 67.15 L/s. The sewer downstream of the Michael-Stoqua Street sewer, along Hemlock Road, from MH205A to MH206A has a wastewater flow of 7.71 L/s, with a spare capacity of 23.31 L/s. As such, it is IBI Group’s opinion that the existing sanitary sewers in Michael-Stoqua Street and Hemlock Road can accommodate the sanitary flow from the proposed development.

3.2 Proposed Sewers

All on-site sewers have been designed to City of Ottawa and MECP design criteria which include but are not limited to the below listed criteria. The detailed sanitary sewer design sheets which are included in **Appendix C** illustrate the population densities and sewers which provide the necessary outlets. The design wastewater criteria for this analysis area:

3.2.1 Design Flow:

Average Residential Flow	-	280 l/cap/day
Peak Residential Factor	-	Modified Harmon Formula
Infiltration Allowance	-	0.33 l/sec/Ha
Minimum Pipe Size	-	200mm diameter

3.2.2 Population Density:

- Apartment Units - 1.4 person per 1-bedroom unit
  - 2.1 person per 2-bedroom unit

4 SITE STORMWATER MANAGEMENT

4.1 Objective

The purpose of this evaluation is to prepare the dual drainage design, including the minor and major system, for the 1050 Tawadina Road development. The design includes the assignment of inlet control devices, on-site storage, maximum depth of surface ponding and hydraulic grade line analysis. The evaluation takes into consideration the City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), the February 2014 Technical Bulletin ISDTB-2014-01, the September 2016 Technical Bulletin PIEDTB-2016-01 and the June 2018 Technical Bulletin ISTB-2018-04.

4.2 Existing Conditions

CLC completed an update to the servicing report, "Former CFB Rockcliffe Master Servicing Study" in 2020. That report recommended a preferred Stormwater Management Plan for the Wateridge Village at Rockcliffe site. The report recommended construction of two stormwater ponds and related appurtenances to service the CLC property; the Western Stormwater Management Facility and the Eastern Stormwater Management Facility. The Eastern Pond is proposed to provide management of flows from most of Phase 1 and 2 of the CLC property, including the subject site. The Eastern pond was constructed and put into service in 2017.

The MSS Report also recommends a series of local and trunk storm sewers to collect runoff from Phases 1 and 2 and route those flows to the Eastern Facility. The Phase 1 design followed the recommendations of the MSS report, including construction of the large diameter sewers, which outlet to the Eastern Stormwater Management Facility; the Eastern Stormwater Management Facility and outlet to the Ottawa River. The Phase 2B storm sewers connect to the downstream Phase 1 sewer system. A copy of the storm drainage area plan and the storm sewer design sheet for Phase 2B are included in **Appendix D**.

4.3 Design Criteria

The stormwater system for the subdivision was designed following the principles of dual drainage, making accommodations for both major and minor flow.

Some of the key criteria include the following:

- Design Storm — 1:2-year return (Ottawa)
- Rational Method Sewer Sizing
- Initial Time of Concentration — 10 minutes
- Runoff Coefficients
  - Landscaped Areas — C = 0.25
  - Landscaped Area with Pathway/Roof — C = 0.50 - 0.65
  - Building and Roof Area — C = 0.90
  - Parking Area and Driveway — C = 0.90
- Pipe Velocities — 0.80 m/s to 3.0 m/s
- Minimum Pipe Size — 250 mm diameter (200 mm CB Leads)

4.4 System Concept

According to the Wateridge Phase 2B report prepared by IBI Group dated April 2019, the development of the adjacent downstream properties included the expected stormwater servicing needs of the subject property. The existing storm sewers constructed adjacent to the site were oversized to provide the needed capacity for minor storm runoff from the subject site. Minor storm runoff from the subject site is proposed to connect to the existing 525 mmØ sewer in Bareille-Snow Street.

4.4.1 Dual Drainage Design

The dual drainage system proposed for the subject site will accommodate both major and minor stormwater runoff. Minor flow from the subject site will be conveyed through the storm sewer network and discharge into the existing 525 mmØ sewer in Bareille-Snow Street.

The balance of the surface flow not captured by the minor system will be conveyed via the major system. Where possible, storage will be provided in surface sags or low points within the roadway. Once the maximum storage is utilized, the excess flow will cascade to the next downstream street sag. Major flow up to 100-year storm event will be restricted and detained on-site. Emergency overflow will be directed towards the south-west corner of the site at Bareille-Snow Street.

4.4.2 Proposed Minor System

Using the criteria identified in Section 4.3, the proposed on-site storm sewers were sized accordingly. A detailed storm sewer design sheet and the associated storm sewer drainage area plan are included in **Appendix D**. The general plan of services, depicting all on-site storm sewers can be found in **Appendix A**.

4.5 Stormwater Management

Wateridge Phase 2B is part of the larger development referred to as the Former CFB Rockcliffe. The stormwater management strategy was outlined in the “Former CFB Rockcliffe Master Servicing Study” (MSS) (IBI Group, August 2020). Phase 2B is located between Hemlock Road and Tawadina Road (refer to Figure 1.1). As part of the Phase 2B development, the design of downstream Phase 2A has been completed.

The subject site is part of the drainage area that ultimately discharges to the Eastern SWM Facility. The trunk storm sewer to the pond and the pond itself were constructed as part of Wateridge Phase 1A.

4.5.1 Water Quality Control

The design takes into consideration the August 2020 MSS, the “Design Brief Wateridge Village at Rockcliffe Phase 1B” (IBI Group, June 2017), the “Design Brief Wateridge Village at Rockcliffe Phase 1A” (IBI Group, April 2016), the City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), and the February 2014 Technical Bulletin ISDTB-2014-01.

Any runoff from the site, as with all future developments in Wateridge Village at Rockcliffe, will have end of pipe quality treatment. Any impacts to receiving watercourses will therefore be mitigated. There are no municipal drains in the vicinity of the subject development and there are no drainage catchment diversions proposed by the current development.

4.5.2 Water Quantity Control

The subject site will be limited to a maximum minor system release rate of 195 L/s according to Wateridge Phase 2B Design Brief dated April 2019. In the Phase 2B subdivision stormwater management system design, the development blocks are subjected to minor system inflow restriction with major flow cascading to a street segment. The restricted rates were provided in Table 2-2, taken from the Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing, which is included in **Appendix A**. This will be achieved through a combination of inlet control devices (ICD's) at inlet locations, surface storage where possible and underground storage where required.

Surface flows in excess of the site's allowable release rate will be stored on site in a proposed cistern and gradually released into the minor system to respect the site's allowable release rate. The maximum surface retention depth located within the developed areas will be limited to 300mm during a 1:100 year event as show on the ponding plan located in **Appendix D** and grading plans located in **Appendix E**. Overland flow routes will be designed to permit emergency overland flow.

The majority of onsite stormwater is to be directed to a cistern in the underground parking garage. This cistern will be fitted with an ICD to restrict the flowrate offsite while providing sufficient volume to retain up to and including the 100 year storm event. Roof flows from Buildings A and B enter the infiltration gallery at 88.83. If infiltration is not able to keep up with the flow, the gallery outlets at 88.98 through the overflow pipe (which connects to the CB1 lead). The overflow enters the cistern at 88.23. The cistern outlets via gravity at 86.73. An ICD fitted to the cistern limits the outflow to city sewers.

Along the perimeter of the site, the opportunity to capture and store runoff is limited due to grading constraints and building geometry. These areas will discharge uncontrolled to Tawadina Road, Michael Stoqua Street and Bareille-Snow Street. These areas are located at the perimeter of the site where it is necessary to tie into public boulevards and adjacent properties or in areas where ponding stormwater is undesirable.

Based on the proposed site plan, the total uncontrolled area has been calculated to be (0.09+0.05) 0.14 ha. For the detailed storm drainage area plan for the site, refer to Drawing 500 in **Appendix D**.

Based on a 1:100 year event, the flow from the 0.14 ha uncontrolled area can be determined as:

$\mathbf{Q_{uncontrolled}} = \mathbf{2.78} \times \mathbf{C} \times \mathbf{i_{100yr}} \times \mathbf{A}$ where:

C = Average runoff coefficient = 0.58 x 1.25 = 0.725 (100 year C-value)

$\mathbf{i_{100yr}}$ = Intensity of 100-year storm event (mm/hr)

$= 1735.688 \times (T_c + 6.014)^{0.820} = 178.56$ mm/hr; where $T_c = 10$ minutes

A = Uncontrolled Area = 0.14 Ha

Therefore, the uncontrolled release rate can be determined as:

$\mathbf{Q_{uncontrolled}} = \mathbf{2.78} \times \mathbf{C} \times \mathbf{i_{100yr}} \times \mathbf{A}$

$= 2.78 \times 0.725 \times 178.56 \times 0.14$

$= 50.38$ L/s

The Maximum allowable release rate from the site can be determined by subtracting the Uncontrolled release rate from the minor system restricted flow rate.

$Q_{max} = Q_{restricted} – Q_{uncontrolled}$

Q_{max} = 195 L/s – 50.38L/s

Q_{max} = 144.62 L/s

Surface flows in excess of the site's allowable release rate will be stored on site in the proposed underground cistern and gradually released into the minor system to respect the site's allowable release rate. There will be no surface retention located within the developed site plan. Overland flow routes will be detailed on the grading to permit emergency overland flow.

The modified rational method was used to evaluate the on-site stormwater management. There are two uncontrolled areas on this site. The flows are calculated above. Therefore, the total restricted flow rate through the minor system will be the design flow rate of **144.62 l/s**. This will be achieved using an Inlet Control Device placed in the storm control manhole on-site. A summary of the ICD's, their corresponding storage requirements, storage availability, and associated drainage areas has been provided below.

DRAINAGE AREA	ICD RESTRICTED FLOW (L/s)	100 YEAR STORAGE REQUIRED (m^3)	SURFACE STORAGE PROVIDED (m^3)
SC#3	144.00	140	0
TOTAL	**144.00**	**140**	**0**

*

4.5.3 2 Year Ponding

A review of the 2-year ponding has been completed using the modified rational method. A minimum Tc of 3min has been used. Where volumes are calculated as a negative value, 13.85m3 has been shown. A summary of each drainage area has been provided below.

DRAINAGE AREA	Total 2-Year Ponding Volume (m3)	Comment
SC#3	13.85	This area is controlled at CTRL MH1, and there is 140m3 of sub- surface storage provided in this area. The required ponding is provided underground. A 50% reduction to the release rate was considered for this area.

Based on the above, there will be no surface ponding in the 2-year event.

4.5.4 100 year + 20% Stress Test

A cursory review of the 100yr event + 20% has been performed using the modified rational method. The Peak flow from each area during a 100-year event has been increased by 20%. The calculations have been included in **Appendix D.**

A summary of the require storage volumes, and overflow balances is provided below.

DRAINAGE AREA	ICD RESTRICTED FLOW (L/s)	100yr20 STORAGE REQUIRED (m^3)	SURFACE STORAGE PROVIDED (m^3)	100yr20 OVERFLOW (m^3)
SC#3	144.00	183.08	140	43.08
TOTAL	**144**			**43.08**

The stress test overflow from SC#3 will follow the intended overflow route as identified in the Phase 2B grading design drawings. The volume of overflow is 43.08m3. Based on the Tc of 19minutes, this volume can be reverse calculated to 37.79 L/s.

5 LOW IMPACT DEVELOPMENT

5.1 Introduction

Aquafor Beech was retained by Arcadis on behalf of WestUrban Developments Ltd. to complete the design of an infiltration-based Stormwater Management (SWM) facility in support of the development at 1050 Tawadina Road, Ottawa. The facility is to serve as an integral part of the site's ability to achieve erosion control, water balance, and water quality targets in accordance with the Stormwater Management Existing Conditions Report & LID Pilot Project Scoping (Aquafor Beech (2015).

The site is encompassed by Tawadina Road to the North, Michael Stoqua Street to the East, a future development and Hemlock Road to the South, and Rue Bareille-Snow Street to the West. Presently, the site is vacant and located on the former CFB Rockcliffe air base site. The surrounding roads and underground services for the site have been constructed. The site has been zoned for a Mid-Rise Mixed Use.

The proposed development block consists of two 9-storey residential buildings with one level of underground parkade. The buildings located northwest and southeast are labelled as Building A and Building B respectively. The site also features a central plaza area with a small amenity building, and a small surface parking lot with access from Rue Bareille-Snow Street.

5.2 Background Information

A review of both existing site conditions and relevant design standards was completed to support the development of the infiltration facility. The following subsections outline relevant information from both review exercises.

5.2.1 Relevant Design Standards

The following design standards were referenced in the design development process for the proposed infiltration facility:

1. City of Ottawa Sewer Design Guidelines (Second Edition, October 2012)
2. Stormwater Management Planning and Design Manual (Ministry of Environment, Conservation, and Parks, March 2003)
3. City of Ottawa Low Impact Development (LID) Technical Guidance Report: Implementation in Areas with Potential Hydrogeological Constraints (February, 2021)
4. Low Impact Development Stormwater Management Guidance Manual – Draft for Consultation (Ministry of Environment, Conservation, and Parks, January 2022)
5. Low Impact Development Stormwater Management Practice Inspection and Maintenance Guide – Version 1.0 (Toronto Region Conservation Authority, 2016)

5.2.2 Subsurface Conditions

Two onsite investigations were completed within the 1050 Tawadina Road development block area:

1. Geotechnical Investigation: Proposed Two New Apartment Buildings – 1050 Tawadina Road, Ottawa, ON (Englobe, November 2022); and,
2. Permeability Testing and Monitoring Well Installations – 1050 Tawadina Road, Ottawa (McIntosh Perry, August 2023)

The Geotechnical Investigation was completed in 2022 by Englobe, involving installation of three boreholes and one monitoring well across the site. These features were used to classify subsurface soil physical and chemical properties, groundwater depth, and bedrock conditions. With this information, a number of design recommendations were developed including but not limited to subgrade preparation, engineered shoring, temporary dewatering, and foundation design.

In-situ infiltration testing was completed at a number of test pits and holes to various depths across the site in the summer of 2023. Testing was completed using a Guelph permeameter. Each test consisted of a 5-15cm head test, based on the level of saturation and subsurface materials encountered at the test location. Changes in reservoir water levels were monitored and recorded over time until a steady state was reached between three consecutive readings.

The relevant findings from both investigations in regards to design of the infiltration facility are outlined below:

1. Infiltration Facility Setbacks
    a. Infiltration and any other LID practices must be located on site such that a minimum horizontal setback of 2.0m is provided between the LID footprint and edge of building foundations.
2. Bedrock and Groundwater
    a. Bedrock elevation in the approximate infiltration facility excavation area was observed at 87.7m per data collected at BH22-2, or a depth of approximately 2.1m below finished design grade. No groundwater was observed in the monitoring well adjacent to the excavation area (MW22-4) during the single reading on June 3rd, 2022, thus groundwater is not expected to restrict design depth of the facility.
3. Infiltration Rate
    a. In-situ infiltration rates in test pits or cores dug to a 1m depth (TP1 and TP4), approximately the depth of the infiltration facility invert, averaged to 17.3mm/hr. The design infiltration rate adopts a safety factor in accordance with the LID Stormwater Management Guidance Manual, producing an average design infiltration rate of 4.96mm/hr.

5.3 Infiltration Facility Sizing

The following subsections outline the design development process used in sizing the infiltration facility.

5.3.1 Stormwater Management Design Targets

To aid in the development of the infiltration facility, several design targets were identified from the various guidance documents outlined in Section 5.2.2 above.

Table 1 below summarizes the design targets applied and source of information.

Table 1: Various Design Targets Applicable to the Infiltration Facility.

Design Target Category	Target Value or Range	Source
Clearance to bedrock or groundwater	Minimum 1.0m	City of Ottawa LID Technical Guidance Report: Implementation in Areas with Potential Hydrogeological Constraints
Erosion Control Storage	4mm rainfall depth across entire site impervious area	Wateridge Phase 2B LID Developer's Checklist
Water Balance Storage	4mm rainfall depth across entire site impervious area	Wateridge Phase 2B LID Developer's Checklist
Water Quality Storage	15mm rainfall depth across entire site impervious area	Wateridge Phase 2B LID Developer's Checklist
Drawdown Time	48-92 hours	City of Ottawa LID Technical Guidance Report: Implementation in Areas with Potential Hydrogeological Constraints
Average Release Rate from Site	Maximum 50% of the peak allowable rate (97.5 L/s)	City of Ottawa Pre-Application Consultation Meeting (July 21, 2022)

5.3.2 Proposed Hydrologic Conditions

Intensity-duration-frequency (IDF) data was referenced from the City of Ottawa Sewer Design Guidelines, adopting rainfall intensities for the 2-year to 100-year design storm event under a 10-minute time of concentration. Given that the infiltration facility has been designed to only accept inflows from rooftop areas, catchment area was delineated based upon total combined rooftop area from Building 'A' and Building 'B', with a standard impervious surface runoff coefficient of 0.9 adopted for the hydrological analysis. Additionally, the Draft LID SWM Guidance Manual was referenced to identify the recommended Runoff Volume Control Target for achieving Level 1 or 80% annual total suspended sediment (TSS) removal. Table 2 through Table 4 below summarizes the catchment characteristics, peak design storm flows, and required runoff storage volumes relevant to the design.

Table 2: Site Runoff Coefficient Calculation.

Site Runoff Coefficient		
Site Area (ha)		0.72
	RC*	**Area (ha)**
Pavement/Concrete	0.9	0.17
Building	0.9	0.34
Landscaping	0.25	0.16
Pavers	0.9	0.05
Total	**0.76**	**0.72**

Table 3: Design Storm Peak Flows from Building Rooftops.

Return Period	Rainfall Intensity (mm/hr)	Flow (m^3/s)	
		Building A	Building B
2-year	77.1	0.04	0.03
5-year	104.4	0.05	0.04
10-year	122.5	0.061	0.044
25-year	145.3	0.08	0.06
50-year	162.2	0.10	0.07
100-year	179	0.11	0.08

Table 4: Runoff Volume Storage Requirements for Site.

SWM Category	Target Value	Required Volume (m^3)
Erosion Control	4mm rainfall depth across entire site impervious area	22m^3
Water Balance Storage	4mm rainfall depth across entire site impervious area	22m^3
Water Quality Storage	15mm rainfall depth across entire site impervious area	83m^3

To achieve all three stormwater management category targets, the infiltration facility was thus designed to ensure 83m^3 of storage is provided.

5.3.3 Infiltration Facility Summary

With design targets and site constraints established, a design for the infiltration facility was developed. The facility consists of a plastic chamber system complete with inlet debris settling rows, inspection ports, inlet and outlet connections, and an open bottom stone base for infiltration of stored water below the outlet invert. A summary of key design information for the infiltration facility is provided in Table 5 below.

Table 5: Key Design Parameters of Proposed Infiltration Facility.

Design Parameter	Value
Maximum Storage Volume (m^3)	83m^3
Excavation Footprint Area (m^2)	165m^2
Total Facility Depth (m)	0.81m
Minimum Cover (m)	0.6m
Minimum Clearance to Bedrock (m)	1.0m
Drawdown Time (hrs)	61hrs*
Inlet Pipe Diameter(s) (mm)	250mm – x2
Outlet Pipe Diameter (mm)	150mm
Structural Loading Capacity	HS-25 Rated

*Note: drawdown time based off water level reduction from outlet pipe invert to bottom of levelling course 19mm stone.

In addition to the design information in the above table, various other design aspects were incorporated to enhance the function of the system and allow for greater ease of operation and maintenance. These additional design aspects are outlined and described below:

1. Overflow bypass system
   a. Two standard OPSD 705.010 catchbasins are proposed to be installed along the inlet pipes from each building such that in major storm events when the infiltration facility has reached maximum capacity, overflow can exit the system and drain to CB1 or overland through the site entrance onto Rue Bareille-Snow Street. Additionally, the catchbasins allow for bypass should the infiltration facility inlets or outlet become blocked.
2. Inlet Debris Rows
   a. Inlet debris rows are included at each inlet location as part of the Aquabox Cube infiltration chamber design such that sediment and other fine debris has the opportunity to settle in a small forebay area before runoff spills over the internal weir wall and into the main chamber area. The debris rows concentrate sediments entering the system to a small area for ease of maintenance.
3. Inspection Ports
   a. Three inspection ports are provided in the design featuring 375mm diameter riser pipes. These ports can be used for visual inspection inside the chamber or cleanout of sediments via vac truck.

5.4 Operation and Maintenance Considerations

A number of operation and maintenance (O&M) practices should be considered by the site owner to ensure the infiltration facility can maintain its as-designed function in future years. The following considerations are summarized from previous industry experience of Aquafor Beech and the TRCAs' Low Impact Development Stormwater Management Practice Inspection and Maintenance Guide.

Design Component	O & M Description	Frequency
Contributing Catchment	Inspect Contributing rooftop area and paved surfaces near inlet CB2 and CB2 to ensure no significant leaf litter, sediment, leaking contaminated substances, or other garbage debris may enter the system and cause partial or full blockage of the inlet system.	Biannual visual inspections.
Inlet Conveyance System	Inlets should remain unobstructed to ensure runoff enters infiltration facility unimpeded. Visual inspection of inlet catchbasins CB2 and CB3 should be completed. CCTV and flushing of pipe segments should occur when pipe segments are or suspected to be clogged.	Visual Inspection – biannual Flushing & CCTV – when clogging/damage suspected.
Debris Row/ Pretreatment	For effective debris row function, these areas should be inspected visually via the inspection ports for sediment or other debris accumulation limiting storage capacity or conveyance of inlet flows into the main chamber area. Inlet flushing and vac truck cleanout of the debris row shall be adopted to remove debris and sediment when required.	Biannual visual inspections. Flushing & Vac Truck – when sediment accumulation reaches half the height of the debris row geotextile wall.
Main Filter Bed Area	Visual inspection in dry weather to quantify sediment accumulation and inspections following storm events to monitor draw down time. Should facility draw down exceed 92 hours or sediment accumulation limit inlet/outlet function of facility, flushing and vac truck sediment removal shall be adopted.	Annual visual inspections. Flushing & Vac Truck – when drawdown exceeds 92hrs **OR** sediment accumulation impeding inlet/outlet function.
Outlet Conveyance System	Outlet should remain unobstructed to ensure discharged water enters underground cistern unimpeded. Visual inspection of outlet catchbasins CB1 and monitoring of Cistern water levels can help identify any conveyance problems in the outlet system. Where clogging is suspected, CCTV and flushing of pipe sediments should occur.	Visual Inspection – biannual Flushing & CCTV – when clogging/damage suspected.
Emergency Overflow Outlets	Grate openings of CB2 and CB3 along inlet pipes should remain unobstructed and free of debris such that surcharge of excess runoff to the surface in major storm events can occur.	Biannual visual inspections.
Inspection Ports	As a vital component to maintenance access, inspection of the inspection ports to ensure proper function and access is maintained via the surface grates.	Biannual access function inspections.

6 SEDIMENT AND EROSION CONTROL PLAN

6.1 General

During construction, existing stream and conveyance systems can be exposed to significant sediment loadings. Although construction is only a temporary situation, it is proposed to introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These will include:

- groundwater in trench will be pumped into a filter mechanism prior to release to the environment;
- bulkhead barriers will be installed at the nearest downstream manhole in each sewer which connects to an existing downstream sewer;
- seepage barriers will be constructed in any temporary drainage ditches; and
- silt sacks will remain on open surface structure such as manholes and catchbasins until these structures are commissioned and put into use.

6.2 Trench Dewatering

During construction of municipal services, any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed including sediment removal and disposal and material replacement as needed.

6.3 Bulkhead Barriers

At the first manhole constructed immediately upstream of an existing sewer, a ½ diameter bulkhead will be constructed over the lower half of the outletting sewer. This bulkhead will trap any sediment carrying flows, thus preventing any construction –related contamination of existing sewers. The bulkheads will be inspected and maintained including periodic sediment removal as needed.

6.4 Seepage Barriers

These barriers will consist of both the Light Duty Straw Bale Barrier as per OPSD 219.100 or the Light Duty Silt Fence Barrier as per OPSD 219.110 and will be installed in accordance with the sediment and erosion control drawing. The barriers are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

6.5 Surface Structure Filters

All catchbasins, and to a lesser degree manholes, convey surface water to sewers. However, until the surrounding surface has been completed these structures will be covered to prevent sediment from entering the minor storm sewer system. Until rear yards are sodded or until streets are asphalted and curbed, all catchbasins and manholes will be equipped with geotextile filter socks. These will stay in place and be maintained during construction and build until it is appropriate to remove them.

7 APPROVALS AND PERMIT REQUIREMENTS

7.1 City of Ottawa

The City of Ottawa reviews all development documents including this report and working drawings. Upon completion, the City will approve the local watermains, submit the sewer ECA application to the province, and eventually issue a Commence Work Notification.

7.2 Province of Ontario

The Ministry of Environment, Conservation and Parks (MECP) Environmental Compliance Approval is not required for the subject development. A Permit To Take Water for the subject site has been provided by the MECP. The permit, number 0565-A5AMP8, expires on December 31, 2025.

7.3 Conservation Authority

Since no watercourses are impacted by the proposed development, no permits will be required from the local Conservation Authority (Rideau Valley Conservation Authority).

7.4 Federal Government

There are no federal permits, authorizations or approvals needed for this development.

8 CONCLUSIONS & RECOMMENDATIONS

8.1 Conclusions

This report and the accompanying working drawings clearly indicate that the proposed development meets the requirements of the stakeholder regulators, including the City of Ottawa, provincial MECP and SNC. The proposed development is also in general conformance with the Master Servicing Study completed by IBI dated June 2020.

Downstream sanitary and storm sewers were designed with the proposed development area included. There is a reliable water supply available adjacent to the proposed development.

8.2 Recommendations

It is recommended that the regulators review this submission with an aim of providing the requisite approvals to permit the owners to proceed to the construction stage of the subject site.

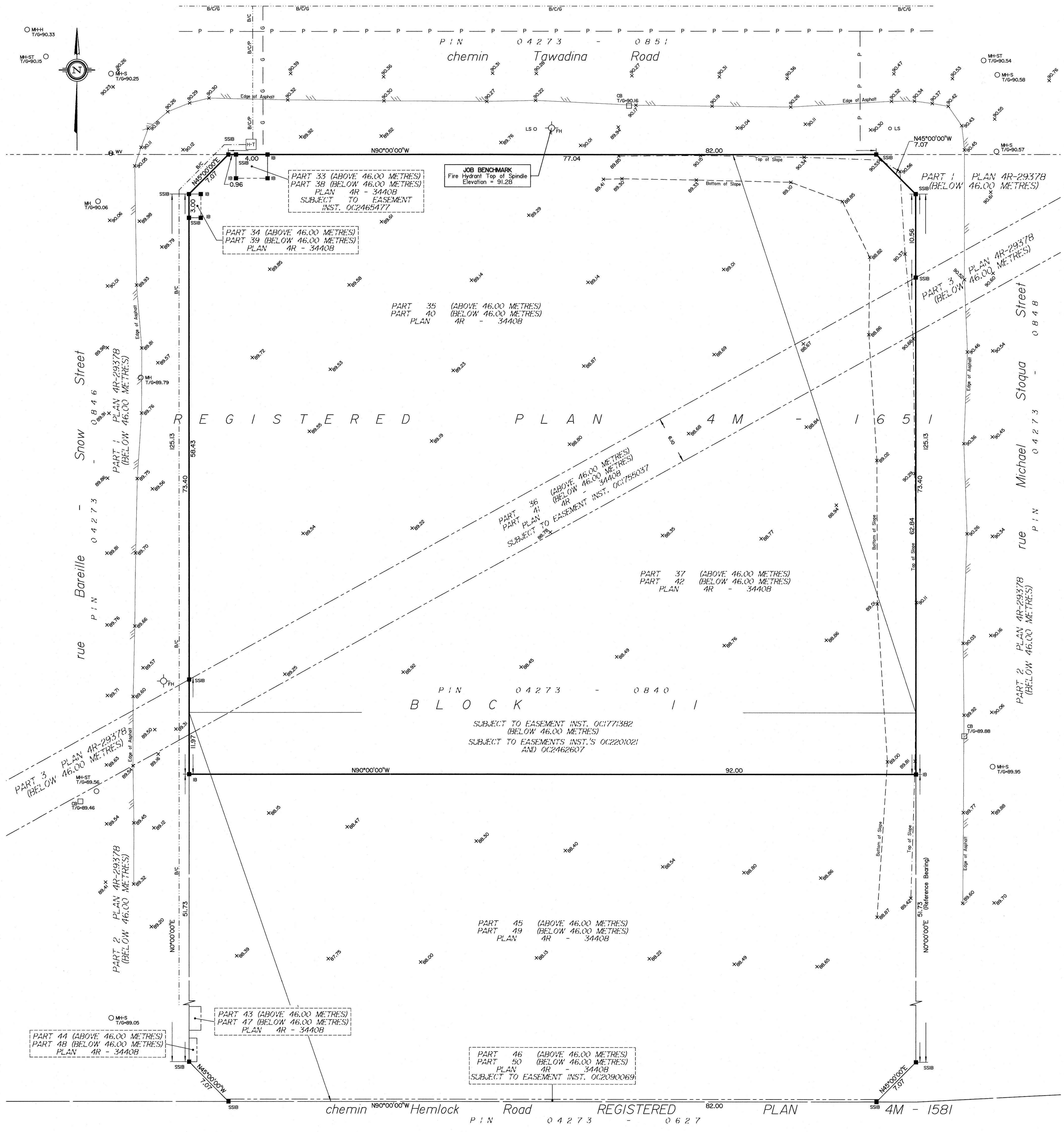
Report revised by:

ARCADIS/IBI GROUP

Samantha E. Labadie, P. Eng.
Civil Engineer

APPENDIX A

AOV Part of Block 11 Registered Plan 4M-1651
Site Plan for 1050 Tawadina Road
142609-001 – Site Servicing Plan
City of Ottawa Pre-Consultation Meeting Notes
Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing
McIntosh Perry – Permeability Testing and Monitoring Well Installations – 1050 Tawadina Road, Ottawa
Development Servicing Study Checklist



TOPOGRAPHICAL PLAN OF SURVEY OF

PART OF BLOCK 11
REGISTERED PLAN 4M-1651
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 250

10 7.5 5.0 2.5 0 5 10 Metres

Metric

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the regulations made under them.
2. The survey was completed on the 5th day of April, 2022.

April 18, 2022
Date

Andrew J. Broxham
Ontario Land Surveyor

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-25453

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

Notes & Legend

—□—	Denotes	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(PI)	"	Plan 4R-34408
FH	"	Fire Hydrant
LS	"	Light Standard
WV	"	Water Valve
MH-ST	"	Maintenance Hole (Storm Sewer)
MH-S	"	Maintenance Hole (Sanitary)
MH-H	"	Maintenance Hole (Hydro)
MH	"	Maintenance Hole (Unidentified)
CB	"	Catch Basin
T/G	"	Top of Grate
— P —	"	Underground Power
— G —	"	Underground Gas
—··—··—	"	Underground Shared Conduit
B/C	"	Shared Bell and Cable
B/C/G	"	Shared Bell, Cable and Gas
B/C/P	"	Shared Bell, Cable and Power
H-T	"	Hydro Transformer Pad
+ 65.00	"	Location of Elevations

Bearings are grid, derived from the westerly limit of rue Michael Stquoa Street, shown to be N0°00'00"E on Plan 4R-34408, and are referred to the central meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Dimensions illustrated hereon are consistent with Plan 4R-34408 unless otherwise noted. All found survey monuments are (AOG) unless otherwise noted.

ELEVATION NOTES

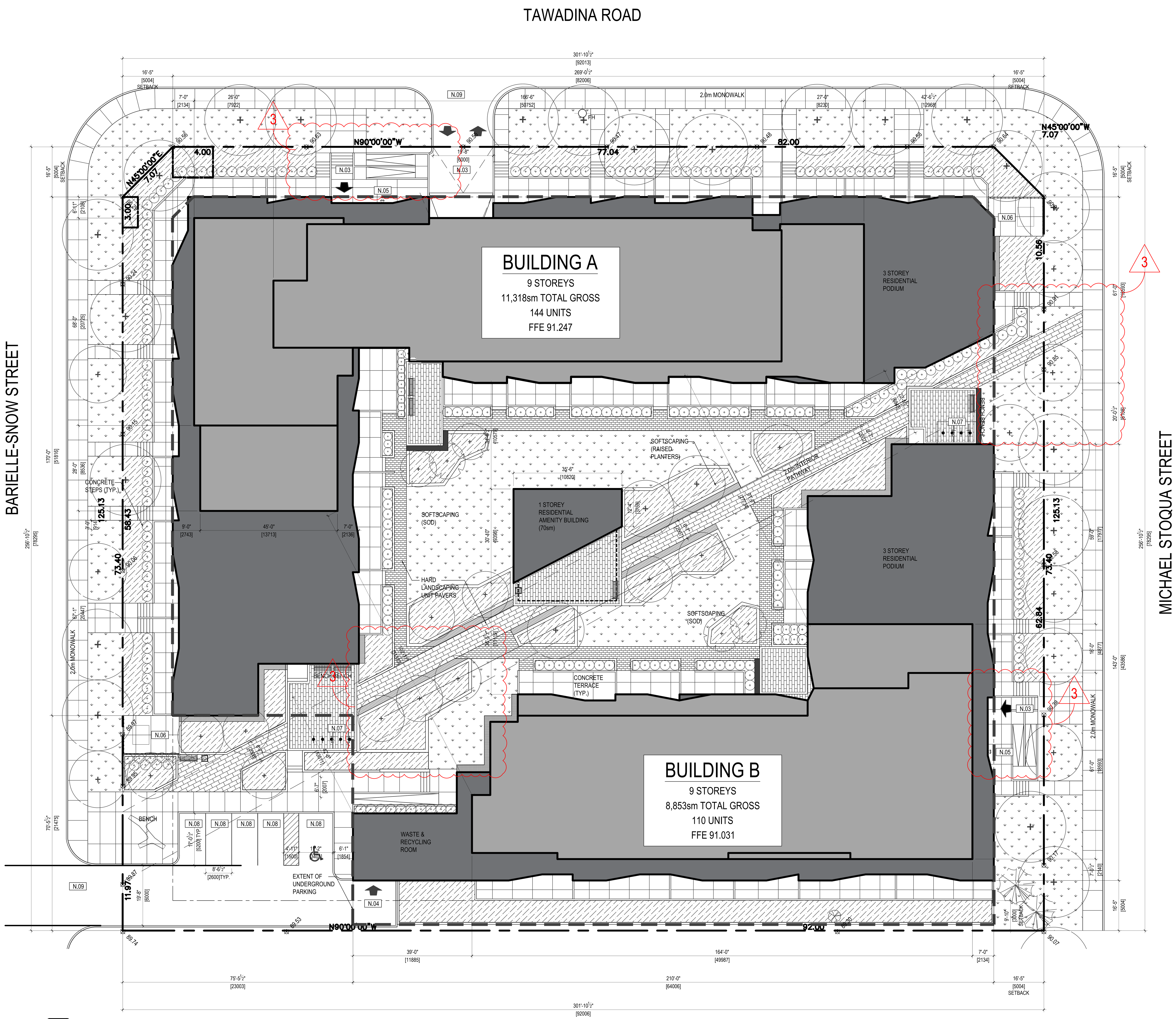
1. Elevations shown are geodetic and are referred to City of Ottawa Vertical Benchmark No. 396 (01919680138), having an elevation of 95.06 metres (CGVD28 geodetic datum).
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.
4. Location of underground services derived from composite utility plan drawing No. 301 (IBI project 118863, Revision 7 dated April 11, 2021).

Ontario Land Surveyors
ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com

Job No. 22726-22 West Urban Blk11 4M-1651 POS D1 | ISW



1 SITE PLAN
DP.100 1/16" - 1'-0"

LOCATION PLAN

GENERAL NOTES

A. ALL EXISTING STRUCTURES, RETAINING WALLS AND LANDSCAPING TO BE REMOVED WITHIN COMBINED DEVELOPMENT PARCELS.

B. REFER TO LANDSCAPE PLANS FOR ALL PLANTING AND GROUND COVER INFORMATION & DETAILS.

C. REFER TO WATERIDGE VILLAGE AT ROCKCLIFFE PHASE 2B ISSUED FOR CONSTRUCTION DRAWINGS AS PREPARED BY IBI GROUP 2019.09.10 FOR ALL DESIGN GEODETIC ELEVATIONS ADJACENT TO DEVELOPMENT PERIMETER.

D. ALL EXISTING SITE INFORMATION AS PER TOPOGRAPHICAL SURVEY PLAN DATED APRIL 5th, 2022 PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

E. ALL SITE REHABILITATION OF SIDEWALKS, BUS ZONE APRONS, AND PAVED LANES ARE TO BE COMPLETED AT THE OWNER'S EXPENSE

F. ANY SNOW ACCUMULATED IN SURFACE PARKING AREAS IS TO BE TRUCKED OFF SITE.

G. WASTE & RECYCLING BINS TO BE ROLLED OUT TO BAREILLE-SNOW STREET FOR CURBSIDE COLLECTION

SHEET NOTES

N.01	PROPOSED ELECTRICAL TRANSFORMER LOCATION.
N.02	PARKADE ENTRY RAMP.
N.03	MAIN BUILDING ENTRY
N.04	GARBAGE AND RECYCLING ACCESS
N.05	FIRE DEPARTMENT CONNECTION
N.06	TRANSFORMER
N.07	BIKE PARKING STALLS
N.08	VISITOR PARKING STALLS
N.09	DEPRESSED CURB

ZONING NOTES

CURRENT ZONING: **GM31 H(30)**

TOTAL DEVELOPMENT STATS

LOT OF AREA	7,179 sm	
LOT WIDTH	92m	
LOT DEPTH	78.3m	
	REQUIRED	**PROPOSED**
SETBACK ALONG TAWADINA ROAD (SIDEYARD)	5m	5m
SETBACK ALONG MICHAEL STOQUA STREET (CORNER/FRONT)	5m	5m
SETBACK ALONG BARIELLE-SNOW STREET (CORNER/FRONT)	5m	5m
INTERIOR SIDEYARD SETBACK (GM31 H(30))	3m	5m
MAXIMUM HEIGHT**	30m	29.5m
MINIMUM NUMBER OF STOREYS	2	9
MAXIMUM FLOOR PLATE AREA ABOVE 20m	750sm	677sm-742sm
TOTAL BUILDING AREA	20,171sm	
TOTAL UNITS	254 UNITS	

***At least half of the total land area of each block will have a maximum building height of 20m (as per Wateridge Village Guide)*

BUILDING A - DEVELOPMENT STATS
NUMBER OF STOREYS **9**
TOTAL UNITS **144**

FLOOR	GROSS AREA
MAIN	1,922sm
2 FLR	1,977sm
3 FLR	1,977sm
4 FLR	1,201sm
5 FLR	1,105sm
6 FLR	1,105sm
7 FLR	677sm
8 FLR	677sm
9 FLR	677sm
TOTAL	**11,318sm**

BUILDING B - DEVELOPMENT STATS
NUMBER OF STOREYS **9**
TOTAL UNITS **110**

FLOOR	GROSS AREA
MAIN	1,423sm
2 FLR	1,331sm
3 FLR	1,331sm
4 FLR	900sm
5 FLR	900sm
6 FLR	742sm
7 FLR	742sm
8 FLR	742sm
9 FLR	742sm
TOTAL	**8,853sm**

VEHICULAR PARKING

MIN. 0.5 RESIDENTIAL STALLS/ RESIDENCE UNIT	
- FIRST 12 SPACES/ BUILDING	
(254 -(2*12))*0.5	=115 REQUIRED
MAX. 40% COMPACT	= 76 PROPOSED
MAX. 5% MOTORCYCLE	= 5 PROPOSED
STANDARD	= 85 PROPOSED
TOTAL RESIDENTIAL STALLS*	**= 166 PROPOSED***

**Located in underground parking garage*

MIN. 0.1 VISITOR STALLS/ RESIDENCE UNIT	
-FIRST 12 SPACES/LOT	
(254-12)*0.1	=25 REQUIRED
	=25 PROPOSED**

*** 5 Stall provided at-grade and 20 in underground parking garage*

TOTAL PARKING PROVIDED **= 191 STALLS**

** Note 5 of the 195 stalls are proposed as barrier free*

BICYCLE PARKING
REQUIRED:
MIN. 0.5 STALLS/ RESIDENCE UNIT =127 SPACES

PROPOSED:

UNDERGROUND	=138 SPACES
EXTERIOR	=18 SPACES
TOTAL	**=156 SPACES**

AMENITY SPACE REQUIREMENTS:
REQUIRED AMENITY SPACE = 6sm/ RESIDENCE UNIT
254 UNITS x 6sm = 1524sm TOTAL AMENITY REQUIRED
MIN. 50% REQUIRED TO BE COMMUNAL = 762sm
PROVIDED COMMUNAL AMENITY SPACE = 1830sm
PROVIDED PRIVATE AMENITY = 654sm
TOTAL PROVIDED AMENITY SPACE = 2484sm

FAAS
FORMED ALLIANCE ARCHITECTURE STUDIO

PROJECT TEAM

ARCHITECT
FAAS ARCHITECTURE
BROGAN GORDON-COOPER
403.923.5072

PLANNING
Q9 PLANNING & DESIGN
CHRISTINE McCUAIG
613.850.8345

CIVIL
IBI GROUP
DEMETRIUS YANNOULOPOULOS
613.447.0504

LANDSCAPE ARCHITECT
CSW LANDSCAPE ARCHITECTS LTD.
JERRY CORUSH
613.866.1608

TRANSPORTATION
IBI GROUP
BEN PASCOLO-NEVEU
613.225.1311 ext.64074

ENVIRONMENTAL
ENGLOBE
ANDREW NAOUM
613.294.2280

RELEASES

NO.	DESCRIPTION	DATE
03	SPC RESPONSE	04.04.24
02	ISSUED FOR SPC	02.28.23
01	ISSUED FOR CLC	10.24.22

PROJECT NAME
1050 TAWADINA RD
WATERIDGE

MUNICIPAL ADDRESS
1050 TAWADINA RD
OTTAWA, ON

LEGAL ADDRESS
PART OF BLOCK 11
REGISTERED PLAN 4M-1651
CITY OF OTTAWA
ANNIS, O'SULLIVAN, VOLLEBEKK LTD. 2022

PROJECT NO.
22.01.W.U.

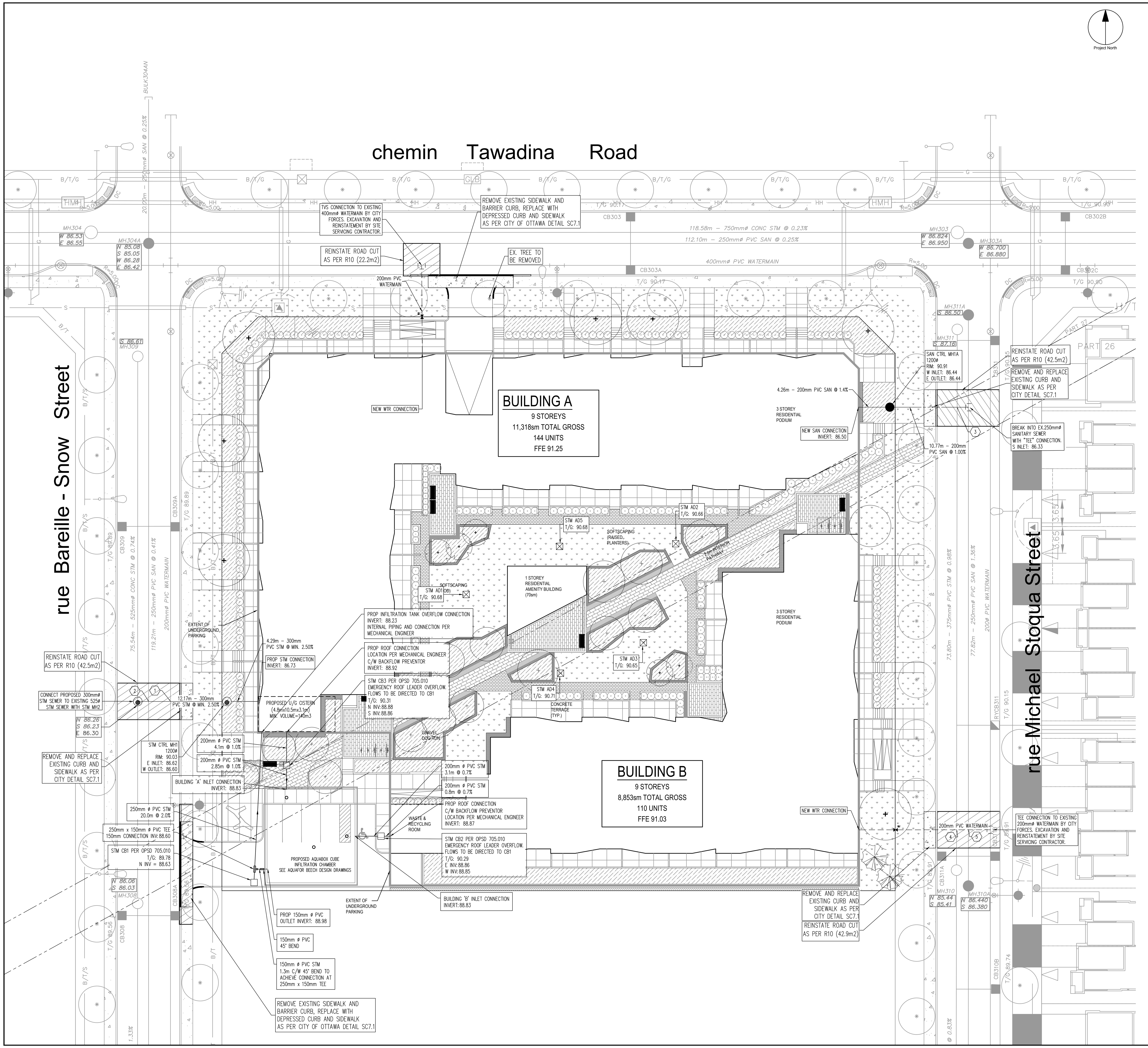
DRAWN LB CHECKED JA

DATE 24.01.19 SCALE AS NOTED

DRAWING TITLE
SITE PLAN

DRAWING NUMBER
SPC.100

D07-12-23-0023
#18332



LEGEND:

	PROPOSED	EXISTING
STORM SEWER		
WATER LINE		
SANITARY SEWER		
PIPE FLOW DIRECTION		
STORM MANHOLE		
AREA DRAIN		
CATCH BASIN		
DOUBLE CATCH BASIN		
TRENCH DRAIN		
PIPE INSULATION		
SANITARY MANHOLE		
OBSERVATION PORT		
WATER HYDRANT		
WATER VALVE		
90° BEND		
45° BEND		
TEE FITTING		
PIPE CROSSING NUMBER		
BUILDING		
RETAINING WALL		
CONSTRUCTION LIMIT		
PROPERTY LINE		
R/W PLAN		

LABEL LEGEND:

T/G = TOP OF GRATE
CB = CATCH BASIN
DCB = DOUBLE CATCH BASIN
MH = MANHOLE
AD = AREA DRAIN

UTILITY LEGEND:

EX. TRANSFORMER
EX. HYDRO MANHOLE
EX. BELL PEDESTAL
EX. BELL GRADE LEVEL BOX
EX. ROGERS PEDESTAL
EX. STREET LIGHT
EX. STREET LIGHT GROUNDING
EX. JOINT UTILITY TRENCH
EX. HYDRO CABLE AND DUCTS
EX. BELL CABLE
EX. ROGERS CABLE
EX. GAS
EX. STREET LIGHT CABLE
EX. UTILITY DROP LOCATIONS
EX. CONCRETE ENCASED DUCT BANK
EX. TREE LOCATION

NOTES:

1. IT IS THE RESPONSIBILITY OF THE APPLICANT/CONSULTANT TO ENSURE COMPLIANCE WITH ALL APPLICABLE PROVINCIAL STANDARDS AND TO OBTAIN ALL PROVINCIAL APPROVALS, INCLUDING BUT NOT LIMITED ENVIRONMENTAL COMPLIANCE APPROVALS.
2. THE CONTRACTOR SHALL ENSURE ALL MATERIAL AND CONSTRUCTION IS IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARD DRAWINGS AND SPECIFICATIONS. DRAWINGS AND SPECIFICATIONS FROM OPSS & OPSD, SHALL BE USED WHERE THERE IS NO EQUIVALENT FROM CITY STANDARDS.
3. THE CONTRACTOR SHALL VERIFY ALL SURVEY STAKE LAYOUT POINTS AND DIMENSIONS AND ANY DISCREPANCIES SHALL BE REPORTED TO THE CONSULTANT PRIOR TO CONSTRUCTION. ANY DISCREPANCIES ARE TO BE IMMEDIATELY REPORTED TO THE CONSULTANT.
4. ALL EXISTING UTILITIES SHOWN ON DRAWINGS (PLAN AND PROFILE) ARE FOR REFERENCE PURPOSES ONLY. THE CONTRACTOR SHALL SATISFY THEMSELVES AS TO THE ACTUAL LOCATION AND DEPTH OF ANY UTILITY AND SHALL BE LIABLE FOR ALL OR ANY DAMAGES.
5. THE POSITION OF ALL STATIC STRUCTURES, SHALLOW UTILITIES, DEEP UTILITIES, AND ANY OTHER ABOVEGROUND OR UNDERGROUND UTILITIES STRUCTURES AND APPURTENANCES SHALL BE FIELD VERIFIED BY THE CONTRACTOR TO SATISFY HIMSELF AND SHALL ASSUME LIABILITY FOR ANY DAMAGES TO THEM DURING CONSTRUCTION. ANY DAMAGES ARE TO BE RECTIFIED TO THE SATISFACTION OF THE CITY INSPECTOR OR FRANCHISE UTILITY OWNERS.
6. REFER TO THE PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT COMPLETED BY ENGLOBE ON OCTOBER 11TH, 2022 FOR GEOTECHNICAL INFORMATION.
7. ALL SEWER AND WATERMAIN PIPES SHALL BE INSTALLED AT A MINIMUM FROST COVER OF 2.4m. SEWER SERVICE LATERALS REQUIRED A MINIMUM OF 2.0m OF COVER.
8. ALL WATERMAIN CONNECTIONS WITHIN MUNICIPAL R.O.W.'S TO BE INSTALLED BY CITY FORCES AT THE OWNER'S EXPENSE.

Pipe Clearance Table

Crossing No.	Bottom of Pipe	Top of Pipe	Clearance
1	87.50 WTR	87.00 STM.	0.50
2	86.62 STM	85.24 SAN.	1.38
3	87.06 STM.	86.60 SAN.	0.46
4	87.40 WTR	86.87 STM.	0.53
5	87.40 WTR	85.77 SAN.	0.63

CLIENT

WestUrban Developments Ltd.

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CLC SUBMISSION	2023-01-11
2	SUBMISSION NO.2 FOR CITY REVIEW	2023-09-13
3	SUBMISSION NO.3 FOR CITY REVIEW	2023-12-20
4	UPDATED FILE NUMBER	2024-04-03
5		
6		
7		
8		

KEY PLAN

1:250

SEAL

LICENSED PROFESSIONAL ENGINEER
A. CHETRAR
100528180
2024/04/03
PROVINCE OF ONTARIO

ARCADIS
333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT
1050 Tawadina Road
WATERIDGE VILLAGE PHASE 2

PROJECT NO: 142609	
DRAWN BY: M.M.	CHECKED BY: J.I.M.
PROJECT MGR: S.L.	APPROVED BY: A.C.

SHEET TITLE
SITE SERVICING PLAN

SHEET NUMBER: C-001
ISSUE: 4

CITY FILE No. D07-12-23-0023   CITY PLAN No. 18977

Pre-Application Consultation Meeting Notes

1050 Tawadina Road
File Number: D07-01-22-0178
Thursday July 21, 2022, Microsoft Teams

Attendees:

City of Ottawa:
Jean-Charles Renaud, File Lead
Joyce Tshiyoyo, Student Planner
Reza Bakhit, Project Manager
Selma Hassan, Urban Design

Applicant Team:
Cameron Salisbury, WestUrban Developments Ltd. (Owner)
Christine McGuaig, Q9 Planning + Design
James Andalis, FAAS Architect
Dorothy Poon, Design Works Engineering
Courtney Clarke
Matthew Fitzgerald
Robert Pringle

Community Association Representatives:
Jane Thompson
Roxanne Field

Regret(s):
Neetie Paudel, Transportation (City)

Subject: 1050 Tawadina Road

Meeting Notes:

Opening & attendee introduction

- Introduction of meeting attendees

Proposal Overview

- Maintain a strong at grade development for the public
- Giving access to the public courtyard
- Balconies added to provide privacy and a sense of connection to the courtyard space
- This is intended to be a rental development
- Working with the team to design this

Questions:

- JC: Is there any particular reason why this development is strictly residential?
  - Cameron: We did consider but looking at the area, which is already mixed-use, we decided to stick to residential
  - Christine: Yes, and the CDP allows for residential only, so this is no problem
- JC: What is the front yard setback?
  - Christine: We will add address component if needed
  - JC: This would be a corner lot – rear yard setback

Preliminary Comments from Related Discipline:

Planning (JC)

- Southern property line
  - Build too close to the southern property line at just 0 metres. If that is to remain, that could be problematic with adjacency to the proposal of the other lot on the southern side.
  - You have units facing south and how they would interact with each other which might be problematic interaction.
- GM31 zone includes floorplate max for buildings over seven storeys
- Two building above four storeys need to be at least 23 metres apart (including to buildings on other properties. Will need to accommodate for half that distance on your property)
- Surface parking spaces are in a prominent location. Why is so much surface parking needed when parking minimum is exceeded by 60 spaces? Area could be better used as soft landscaping.
  - Response (Christine): We would like to make it easier and still have some spaces
  - JC: it would still be good to maybe decrease some spaces. Maybe add only surface parking spaces for accessibility and drop off but move the rest underground
- Trees: Must allow sufficient soil volumes, particularly those on top of the parking structure - at least a metre of soil depth
- A surface access easement would be required for the pedestrian connection.
- Please consider designing the site to allow a shared entrance with the future development to the south.
- When a site plan is filed, the applicant should show that their plan aligns with the CLC approved subdivision plan for street treatment. Please show this information on the site/landscape plans greyed out. Ensure adequate space for street trees.

Urban Design (Selma)

UDRP, Design Brief and CDP Design Guidelines

- The site is a mixed use block in the Core Area and is required to go before the City's Urban Design Review Panel. The following link should take the applicant to the information page on the UDRP Urban Design Review Panel | City of Ottawa. If they have any questions, they can contact the UDRP co-ordinator Sole Carvajal sole.carvajal@ottawa.ca
- A Design Brief is required with the application submission. The Terms of Reference for the Design Brief is attached. All items highlighted in yellow must be clearly addressed in written and / or graphic format as appropriate.

- The CDP includes a number of guidelines that are relevant to this site. There are at least four around the theme of maximum length of straight, continuous, building frontages (40m) and variations in setbacks to break up long facades. As presented, at eye level a pedestrian would be looking at very long, straight, solid brick facades. This does not meet the direction of the guidelines or contribute to animation of the street. The applicant is asked to reconsider this edge treatment.
- The CDP includes a guideline stating "Although the maximum building height in mid-rise mixed-use sections of the Core (blocks 31-33, 35-37) is 30 metres, at least half of the total land area of each of these blocks will have a maximum building height of 20 metres". As presented, the proposal meets this guideline.

Zoning

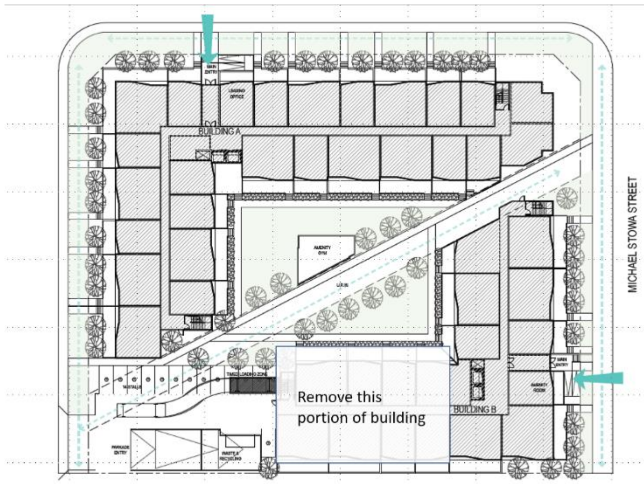
- Please provide drawings that dimension:
  - The setbacks from all property lines
  - The 23m separation distance after the 4th floor
  - The width of landscaped area / landscape buffers as noted in zoning
  - The depths of all projections into the ROW
- Please show and label the footprint of the underground parking garage
- For buildings over 20 storeys in height, zoning requires the maximum building area of each floor plate over 20 metres to be 750 square metres of gross floor area. On building A, the gross floor area of the 8th and 9th floor appear to be 1212.6m^2 and 839.6m^2, respectively. The applicant is asked to re-examine their building design to address this zoning requirement.

Landscape

- I will reserve the landscape comments until a landscape plan is provided. However, street tree planting is important, as is general planting on site. The landscape drawings need to show and detail that trees planted above the parking garage will have the soil volumes and growing conditions necessary to achieve optimal growth.

Built Form

- It is suggested that the applicant simplify the overall architectural expression, in particular on the upper floors.
- As noted in point #3, the proposal presents a solid wall to the street on all facades, at eye level. This is not an acceptable interface to the public realm. The building needs to be closer to grade to reduce the expanse of this wall. The patio guard railing should be transparent or translucent and not a solid brick material.
- If the southern property line is considered in interior side yard, then the required setback is 3m. Given the 7 storey building height and the potential for the abutting site to build to 30m in height also with a 3m setback, then the 3m setback is not adequate despite what is permitted by the zoning. An optimal configuration for both sites would be a U-shaped development, so that the two sites together create a perimeter block development. It is suggested that the applicant remove the 'southern wing' of the building as shown.



Transportation (Neetie)

- Reduced scope of TIA is accepted. Design review component should be included (already discussed with the transportation consultant). Additionally, Module 4.5- Transportation Demand Management should also be included.
- Post-Development Monitoring Plan (monitoring cut-through, transit shares and network constraints) was prepared as part of the TIA for Wateridge Phase 2A/2. The study shall commence one year after 80% occupancy of each phase of subdivision.
- Turning templates will be required for all accesses showing the largest vehicle to access the site(loading trucks, garbage etc.); required for internal movements and at all access (entering and exiting and going in both directions). Ensure they are no conflicts with the loading zone and surface parking.
- Internal walkways should be a minimum of 1.5m.
- Ensure the access is 3m away from the property line (measured at the highway line and at the curb line or edge of the roadway).
- Site triangles at the following locations on the final plan will be required:
    - Local Road to Local Road: 3 metre x 3 metres
- As the site proposed is residential, AODA legislation applies for all areas accessible to the public (i.e. **outdoor pathways**, parking, etc.).
    - Please consider using the City's Accessibility Design Standards, which provide a summary of AODA requirements. https://ottawa.ca/en/city-hall/creating-equal-inclusive-and-diverse-city/accessibility-services/accessibility-design-standards-features#accessibility-design-standards

Civil Engineer (Reza)

General:

- It is the sole responsibility of the consultant to investigate the location of existing underground utilities in the proposed servicing area and submit a request for locates to avoid conflict(s). The location of existing utilities and services shall be documented on an **Existing Conditions Plan**.

- Reference documents for information purposes:
    - Ottawa Sewer Design Guidelines (October 2012)
    - Technical Bulletin PIEDTB-2016-01

- Technical Bulletins ISTB-2018-01, ISTB-2018-02 and ISTB-2018-03.
- Ottawa Design Guidelines - Water Distribution (2010)
- Technical Bulletin ISTB-2021-03
- Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
- City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
- City of Ottawa Environmental Noise Control Guidelines (January 2016)
- City of Ottawa Accessibility Design Standards (2012) (City recommends development be in accordance with these standards on private property)
- Ottawa Standard Tender Documents (latest version)
- Ontario Provincial Standards for Roads & Public Works (2013)
- Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-424 x.44455).

Stormwater Management Criteria and Information:

- The subject site located in the new Water ridge development. Therefore, the designer need to follow the requirements of the master plan and control to the storm sewer level of serving using the design runoff coefficient for the site.
- The designer should make sure that the entrance to the parking garage is higher than the major system overflow. This should be discussed in the SWM report and reflect on the site grading plan.
- **Underground Storage:** Please note that the Modified Rational Method for storage computation in the Sewer Design Guidelines was originally intended to be used for above ground storage (i.e. parking lot) where the change in head over the orifice varied from 1.5 m to 1.2 m (assuming a 1.2 m deep CB and a max ponding depth of 0.3 m). This change in head was small and hence the release rate fluctuated little, therefore there was no need to use an average release rate.

When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. **We therefore require that an average release rate equal to 50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a submersible pump in the design to ensure a constant release rate.**

In the event that there is a disagreement from the designer regarding the required storage, The City will require that the designer demonstrate their rationale utilizing dynamic modelling, that will then be reviewed by City modellers in the Water Resources Group.

Please provide information on UG storage pipe. Provide required cover over pipe and details, chart of storage values, capacity etc. How will this pipe be cleaned of sediment and debris? Provide information on type of underground storage system including product name and model, number of chambers, chamber configuration, confirm invert of chamber system, top of chamber system, required cover over system and details, interior bottom slope (for self-cleansing), chart of storage values, length, width and height, capacity, entry ports (maintenance) etc.

Provide a cross section of underground chamber system showing invert and obvert/top, major and minor HWLs, top of ground, system volume provided during major and minor events. UG storage to provide actual 2- and 100-year event storage requirements.

In regard to all proposed UG storage, ground water levels (and in particular HGW levels) will need to be reviewed to ensure that the proposed system does not become surcharged and thereby ineffective.
Modeling can be provided to ensure capacity for both storm and sanitary sewers for the proposed development by City's Water Distribution Dept. – Modeling Group, through PM and upon request.

- Please note that the minimum orifice dia. for a plug style **ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s** in order to reduce the likelihood of plugging.

Storm Sewer:

- A 525mm dia. CONC storm sewer (2020) is available within Bareille Snow street**.**
- A 750mm dia CONC storm sewer (2020) is available within Tawadina road
- A 375mm dia CONC storm sewer (2020) is available within Michael Stoqua Street.
- A 1200mm dia. CONC Storm sewer (2018) is available within Hemlock road.

Sanitary Sewer:

- A 250mm dia. PVC SAN sewer (2020) is available within Bareille Snow street**.**
- A 250mm dia PVC SAN sewer (2020) is available within Tawadina road
- A 250mm dia PVC SAN sewer (2020) is available within Michael Stoqua Street.
- A 250mm dia. PVC SAN sewer (2018) is available within Hemlock road

Note: A 2400mm dia CONC SAN trunk sewer (1964) runs through the subject property. The City AMB will be circulated on all the submissions for their comments. A protection plans may be required to be submitted for the review. Please make sure to include building footprint plan in the submission and confirm all the proposed structures are outside the easement. The proposal should be satisfactory to the AMB and the maintenance team as well as the development review.

- Please provide the new Sanitary sewer discharge and we confirm if sanitary sewer main has the capacity. An analysis and demonstration that there is sufficient/adequate residual capacity to accommodate any increase in wastewater flows in the receiving and downstream wastewater system is required to be provided. Needs to be demonstrated that there is adequate capacity to support any increase in wastewater flow.
- Please apply the wastewater design flow parameters *in Technical Bulletin PIEDTB-2018-01.*
- Sanitary sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) *Monitoring Devices*.
- A backwater valve is required on the sanitary service for protection.

Water:

- A 203mm dia. PVC watermain (2021) is available within Bareille Snow street**.**
- A 406mm dia PVC watermain (2021) is available within Tawadina road
- A 203mm dia PVC watermain (2021) is available within Michael Stoqua Street.
- A 305mm dia. PVC watermain (2018) is available within Hemlock road

- Existing residential service to be blanked at the main.
- **Water Supply Redundancy:** Residential buildings with a basic day demand greater than $50m^3$/day (0.57 L/s) are required to be connected to a minimum of two water services separated by an isolation valve to avoid a vulnerable service area as per the *Ottawa Design Guidelines - Water Distribution, WDG001, July 2010 Clause 4.3.1 Configuration.*
- Please **review Technical Bulletin ISTB-2018-0**, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A **hydrant coverage figure** shall be provided and **demonstrate there is adequate fire protection for the proposal**. Two or more public hydrants are anticipated to be required to handle fire flow.
- Boundary conditions are required to confirm that the require fire flows can be achieved as well as availability of the domestic water pressure on the City street in front of the development. Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons. Please provide the following information to the City of Ottawa via email to request water distribution network boundary conditions for the subject site. Please note that once this information has been provided to the City of Ottawa it takes approximately 5-10 business days to receive boundary conditions.
    - Type of Development and Units
    - Site Address
    - A plan showing the proposed water service connection location.
    - **Average Daily Demand** (L/s)
    - **Maximum Daily Demand** (L/s)
    - **Peak Hour Demand** (L/s)
    - **Fire Flow** (L/min)

[*Fire flow demand requirements shall be based on **Fire Underwriters Survey (FUS)** Water Supply for Public Fire Protection 1999*]
[Fire flow demand requirements shall be based on ISTB-2021-03]
<u>*Note: The OBC method can be used if the fire demand for the private property is less than 9,000 L/min. If the OBC fire demand reaches 9000 L/min, then the FUS method is to be used*</u>*.*
Exposure separation distances shall be defined on a figure to support the FUS calculation and required fore flow (RFF).

- **Hydrant capacity shall be assessed to demonstrate the RFF can be achieved**. Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.

Snow Storage:

- Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved site plan and grading plan. Snow storage shall not interfere with approved grading and drainage patters or servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m.

Snow storage areas shall not occupy driveways, aisles, required parking spaces or any portion of a road allowance. If snow is to be removed from the site please indicate this on the plan(s).

Gas pressure regulating station:

A gas pressure regulating station may be required depending on HVAC needs (typically for 12+ units). Be sure to include this on the Grading, Site Servicing, SWM and Landscape plans. This is to ensure that there are no barriers for overland flow routes (SWM) or conflicts with any proposed grading or landscape features with installed structures and has nothing to do with supply and demand of any product.

Gas Pressure Regulating Station.pd

Regarding Quantity Estimates:

Please note that external Garbage and/or bicycle storage structures are to be added to QE under Landscaping as it is subject to securities.In addition, sump pumps for Sanitary and Storm laterals and/or cisterns are to be added to QE under Hard items as it is subject to securities, even though it is internal and is spoken to under SWM and Site Servicing Report and Plan.

CCTV sewer inspection

CCTV sewer inspection required for pre and post construction conditions to ensure no damage to City Assets surrounding site.
site. Conditions for Pre-Construction/ Pre-Blast Survey & Use of Explosives will be applied to agreements. Refer to City's Standard S.P. No. F-1201 entitled Use of Explosives, as amended.

Required Engineering Plans and Studies:
PLANS:

- Existing Conditions and Removals Plan
- Site Servicing Plan
- Grade Control and Drainage Plan
- Erosion and Sediment Control Plan
- Roof Drainage Plan (If roof utilized for the SWM)
- Topographical survey

REPORTS:

- Site Servicing and Stormwater Management Report
- Geotechnical Study/Investigation
- Slope Stability Assessment Reports (if required, please see requirements below)
- Noise Control Study
- Phase I ESA 4)
- Phase II ESA (Depending on recommendations of Phase I ESA)

- Wind analysis
- Shadow Study

Please refer to the **City of Ottawa Guide to Preparing Studies and Plans [Engineering]:**
Specific information has been incorporated into both the Guide to Preparing Studies and Plans for a site plan. The guide outlines the requirement for a statement to be provided on the plan about where the property boundaries have been derived from.
Added to the general information for servicing and grading plans is a note that an **O.L.S.** should be engaged when reporting on or relating information to property boundaries or existing conditions. The importance of engaging an **O.L.S.** for development projects is emphasized.

Phase One Environmental Site Assessment:

- A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required.
- The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg. 153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.
- Official Plan Section 4.8.4:
- https://ottawa.ca/en/city-hall/planning-and-development/official-plan-and-master-plans/official-plan/volume-1-official-plan/section-4-review-development-applications#4-8-protection-health-and-safety

Geotechnical Investigation:

- A Geotechnical Study/Investigation shall be prepared in support of this development proposal.
- Reducing the groundwater level in this area can lead to potential damages to surrounding structures due to excessive differential settlements of the ground. The impact of groundwater lowering on adjacent properties needs to be discussed and investigated to ensure there will be no short term and long term damages associated with lowering the groundwater in this area.
- Geotechnical Study shall be consistent with the **Geotechnical Investigation and Reporting Guidelines for Development Applications**.

https://documents.ottawa.ca/sites/documents/files/geotech_report_en.pdf

Slope Stability Assessment Reports

- A report addressing the stability of slopes, prepared by a qualified geotechnical engineer licensed in the Province of Ontario, should be provided wherever a site has slopes (existing or proposed) steeper than 5 horizontal to 1 vertical (i.e., 11 degree inclination from horizontal) and/or more than 2 metres in height.
- A report is also required for sites having retaining walls greater than 1 metre high, that addresses the global stability of the proposed retaining walls.
- https://documents.ottawa.ca/en/document/slope-stability-guidelines-development-applications

Noise Study:

- A **Transportation Noise Assessment** is required as the subject development is located within 100m proximity of an Arterial Road
- A **Stationary Noise Assessment** is required in order to assess the noise impact of the proposed sources of stationary noise (mechanical HVAC system/equipment) of the development onto the surrounding residential area to ensure the noise levels do not exceed allowable limits specified in the City Environmental Noise Control Guidelines.

https://documents.ottawa.ca/sites/default/files/documents/enviro_noise_guide_en.pdf

Wind analysis:
When greater than 8-storey in height Wind Study for all buildings/dwellings.

- A wind analysis must be prepared, signed and stamped by an engineer who specializes in pedestrian level wind evaluation. Where a wind analysis is prepared by a company which do not have extensive experience in pedestrian level wind evaluation, an independent peer review may be required at the expense of the proponent.
- Terms of Reference: Wind Analysis (ottawa.ca)

Shadow Study
When greater than 8-storey in height, a Shadow Study required for all buildings/dwellings.

Exterior Site Lighting:

- Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a **Certification (Statement) Letter** from an acceptable professional engineer stating that the design is compliant.

Fourth (4th) Review Charge:
Please be advised that additional charges for each review, after the 3rd review, will be applicable to each file. There will be no exceptions.

Construction approach – Please contact the Right-of-Ways Permit Office TMconstruction@ottawa.ca early in the Site Plan process to determine the ability to construct site **and copy File Lead on this request**.

Please note that these comments are considered preliminary based on the information available to date and therefore maybe amended as additional details become available and presented to the City. It is the responsibility of the applicant to verify the above information. The applicant may contact me for follow-up questions related to engineering/infrastructure prior to submission of an application if necessary.

If you have any questions or require any clarification, please let me know.

Community Association Comments:

Roxanne

- It was good having a comprehensive package

Jane Thompson

- We like the general approach to the development especially the underground and a storage is great
  - It fits the goals of the centre of the community
- The biggest issue: has to do with transportation and transit
  - Very far from transit stops and not on the main bus line
  - it is a very car-centric community and there needs to be more transit
  - Even though there is parking offered, there is still more demand on parking than the surplus or what is provided
  - Advocating more transport
    Afraid to be limited in space with the development coming in
  - They feel isolated from other modes of transport so parking needs to be more sufficient
  - Would not be comfortable with less than the minimum requirement for visitor parking
  - Happy to see the bicycle parking as there are bicycle lanes near the area
  - TIA screening needed to see how many units is being provided
- Multi-use
  - The community is encouraging commercial uses to accommodate mores services and it would please the residents
  - Something like adding little shops and offices
  - More transparency and connection to the streets especially from the corridors
- Parking entry adjacent to the neighboring site
  - Discussing how they would get along and if both sides are comfortable with that
- Because of rental and high density – need to consider the effects of the drop off
  - May cause issues for the winter
  - Also adding space for garbage and space for collection
  - It’s a dense development but be careful as more people means more cars
  - Need for more amenity space
- Colours
  - Predominance of dull colours in the neighborhood but some liveliness and fun colours added would be great for the area

Next Steps:

- Follow up email that will include meeting notes and the plans and studies list required for SPC submission
- Book some time to approach community association to discuss proposal, as well as with the ward Councillor

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Memorandum

To/Attention	John Bernier, City of Ottawa Shawn Wessel, City of Ottawa	**Date**	April 26, 2022
From	Meghan Black Jim Moffatt	**Project No**	118863-5.3.1.5
cc	Mary Jarvis, Canada Lands Company		
Subject	Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing		

1. Background

Blocks 11 and 12 are located within Phase 2B of the Wateridge development and are indicated in **Figure 1**. The municipal servicing of the two blocks was addressed in, "Design Brief, Wateridge Village at Rockcliffe Phase 2B," prepared by IBI Group in April 2019. Subsequent to the approval of the Phase 2B detailed design, Canada Lands Company has sub-divided the subject blocks into five parcels for development. The parcels, identified as Parcels 1-5, are being considered for purchase by various parties. IBI has been engaged to assess the impact of this change on adjacent existing storm and sanitary sewers. Enclosed **Figure 1** depicts Blocks 11 and 12 and the respective five parcels.

2. Stormwater Management

2.1 Objective

The objective of the evaluation is to assess the impact on the dual drainage system of discretizing Blocks 11 and 12 into Parcels 1-5 and the associated impacts to the storm servicing. The detailed design of Parcels 1-5 will be carried out by others.

2.2 Dual Drainage Design

Per the Phase 2B design brief, minor storm runoff from Block 11 (identified as drainage area B309) drains to Bareille-Snow Street, with major flow tipping to Bareille-Snow Street at Hemlock Road. Minor flow from Block 12 (identified as drainage area B340) drains to Codd's Road with major flow draining to Hemlock Road. The minor system restriction for the two development blocks corresponds to between the 5 and 100 year storm event, and no on-site storage was proposed. The storm drainage area plan (Drawing 750) from the Phase 2B submission is enclosed in **Appendix A** for reference. With the proposed adjustments to the storm servicing for the sub-divided or discretized parcels, minor system capture and on-site storage has been re-assessed.

2.3 Hydrological Analysis

Hydrological analysis of the dual drainage system of the subject site has been conducted using DDSWMM, consistent with the simulations completed for the Phase 2B design brief.

2.3.1 Storm and Design Parameters

The following storms and design parameters have been used in the evaluation. The main hydrological parameters are summarized in **Table 2.1**, with a comparison of what was included in the Phase 2B evaluation.

- **Design Storms:** The subject site has been evaluated with the following storms, consistent with the Phase 2B evaluation:
  - 5 and 100 year 3 hour Chicago storm events, and associated stress test; applied for the evaluation of the trunk storm sewers;
  - 100 year 24 hour SCS Type II storm event, applied for the evaluation of the trunk storm sewers;
  - July 1979, August 1988, August 1996 historical storms per the OSDG.
- **Area and Imperviousness:** Block 11 (identified as drainage area B309) and Block 12 (identified as drainage area B340) have been discretized into Parcels 1 through 5. An imperviousness value of 86% has been applied to the parcels, consistent with the values applied for B309 and B340 in the Phase 2B design brief.
- **Infiltration:** Infiltration losses were selected to be consistent with the OSDG. The Horton values are as follows: f_o = 76.2 mm/h, f_c = 13.2 mm/h, k = 0.00115 s^{-1}.
- **Subcatchment Width:** The catchment width for the parcels was based on 225 m/ha.
- **Slope:** The ground slope was based upon the average slope for both impervious and pervious area. Generally, the slope is approximately 2% (0.02 m/m). This assumes a slope of approximately 1% for impervious or road surfaces and 3% for pervious surfaces (lot grading).
- **Initial Abstraction (Detention Storage):** Detention storage depths of 1.5 mm and 4.67 mm were used for impervious and pervious areas, respectively. These values are consistent with the OSDG.
- **Manning's roughness:** Manning's roughness coefficients of 0.013 and 0.25 were used for impervious and pervious areas, respectively.
- **Baseflow:** No baseflow components were assumed for any of the areas contributing runoff to the minor system within the DDSWMM model.
- **Minor System Capture:** The minor system capture for the parcels ranges from the 5 year to the 100 year, with three parcels capturing between the 5 and 100 year simulated flow.
- **Major System Storage and Routing:** In order to continue to satisfy City design guidelines, on-site storage has been introduced on four of the parcels, as noted below.

A summary of parameters and minor system and on-site storage is presented in the following tables. A summary from the Phase 2B detailed design is included to facilitate review. Refer to

Figure 2 for the overall storm sewer network and to **Figure 3** for a depiction of the minor and major system connectivity for the five parcels.

Table 2.1 Hydrological Parameters

Block	Phase 2B Design Brief							Current Evaluation							
	Drainage Area ID	Area (ha)	Major System: D/S Segment ID	Minor System: MH ID	IMP Ratio	Segment Length (m)	Sub-catchment Width (m)	Parcel	Drainage Area ID	Area (ha)	Major System: D/S Segment ID	Minor System: MH ID	IMP Ratio	Segment Length (m)	Sub-catchment Width (m)
11	B309	1.24	S308A on Bareille-Snow	MH309 on Bareille-Snow	0.86	135.1	270.2	1	B309_1	0.72	S308 on Bareille-Snow	MH309 on Bareille-Snow	0.86	81	162
								2	B309_2	0.52	S308A on Bareille-Snow	MH310 on Michael Stoqua	0.86	58.5	117
12	B340	1.24	S207 on Hemlock	MH305 on Codd's Road	0.86	173.1	346.3	3	B340_3	0.34	S308A on Bareille-Snow	MH308 on Bareille-Snow	0.86	38.25	76.5
								4	B340_4	0.53	S308 on Bareille-Snow	MH309 on Bareille-Snow	0.86	59.63	119.25
								5	B340_5	0.37	S340 on Codd's	MH305 on Codd's Road	0.86	41.63	83.25

Table 2.2 Minor System Restriction and On-site Storage

Block	Phase 2B Design Brief				Current Evaluation					
	Drainage Area ID	Minor System Capture		Required On-Site Storage (cu-m)	Parcel	Drainage Area ID	Minor System Capture		Major System	
		Simulated Flow (l/s)	Corresponding Design Storm				Simulated Flow (l/s)	Corresponding Design Storm	Required On-Site Storage (cu-m)	Comment
11	B309	370	Between 5 and 100	None	1	B309_1	195	Between 5 and 100 year	43	Control up to the 100 year event
					2	B309_2	105	5 year	64	Control up to the 100 year event
12	B340	366	Between 5 and 100	None	3	B340_3	95	Between 5 and 100 year	18	Control up to the 100 year event
					4	B340_4	150	Between 5 and 100 year	21	Control up to the 100 year event
					5	B340_5	139	100 year	None	N/A

2.4 Results of Hydrological Modeling

2.4.1 Minor System

The minor system hydrographs generated by the hydrological model were exported to the hydraulic model for analysis, discussed in **Section 2.5**.

2.4.2 Major System

Due to the adjustment in major system connectivity, the major system has been reassessed. Refer to drainage areas on Drawing 750 from the Phase 2B submission in **Appendix A**.

2.4.2.1 Street Segment Storage

The available and utilized street sag storage is summarized in the below table for street segments in affected by the revised storm servicing of Parcels 1-5.

Table 2.3 Summary of On-site Street Storage (Available and Utilized) During Target Minor System Design Storm in Vicinity of Parcels 1-5

Street	Drainage Area ID	Minor System Design Storm	Available Static Storage (cu-m)	Total Storage Utilized During Minor System Design Storm (cu-m)	Overflow During Minor System Design Storm (l/s)
Michael Stocqua	S310A	5	61.39	0	0
Bareille-Snow	S308A	5	40.38	0	0
Hemlock	S176C	5	1.14	0	0

The results indicate that there is no ponding on the street segments during the minor system design storm.

2.4.2.2 Velocity x Depth

According to the City of Ottawa Sewer Design Guidelines (October 2012), the maximum depth of flow should not exceed 350 mm and the product of velocity and depth on all the street segments should not exceed 0.6 m^2/s during the 100 year storm event.

The cascading overflow is the flow exiting a drainage area when maximum minor system inflow and maximum available ponding has been utilized. To determine velocity of the cascading overflow, a SWMHYMO file was created (118863VD.dat).

To determine velocity of the cascading overflow at critical locations, SWMHYMO was used. The ROW sections were entered into the model with the appropriate longitudinal slopes to obtain the maximum velocity of flow using the Route Channel routine. The overflow is obtained from the respective DDSWMM output file and is noted in the footnotes of the below tables.

To determine depth of the cascading overflow, the *Calculation Sheet: Overflow From Typical Road Ponding Area* provided at the February 2014 Technical Bulletin ISDTB-2014-01 was used. The exception to this is where the road is on grade in which case the depths were obtained from the SWMHYMO model.

The results are presented in **Table 2.4** and **Table 2.5** and the supporting calculations are included in **Appendix A**.

Table 2.4 Summary of Cascading Flow during the 100 year 3 hour Chicago storm

Street	Drainage Area ID	Dummy Segment ID	Overflow (l/s)[1]	Velocity (m/s)[2]	Max. Static Ponding Depth (m)	Depth of Dynamic Flow (m)[3]	Max. Depth (Static + Dynamic) (m)	Velocity x Depth (m^2/s)
Michael Stoqua	S311A	N/A	49	0.73	N/A	0.04	0.04	0.03
Michael Stoqua	S310A	D14	0	0	0.29	0	0.29	0
Bareille-Snow	S309	N/A	43	0.50	N/A	0.05	0.05	0.03
Bareille-Snow	S308	N/A	65	0.84	N/A	0.05	0.05	0.04
Bareille-Snow	S308A	D18	26	0.47	0.26	0.05	0.31	0.03
Codd's	S340	N/A	50	0.88	N/A	0.04	0.04	0.04
Codd's	S231	N/A	100	0.62	N/A	0.07	0.07	0.04
Hemlock	S205C	N/A	37	0.48	N/A	0.05	0.05	0.02
Hemlock	S207	N/A	61	0.55	N/A	0.06	0.06	0.03

(1) Overflow from DDSWMM output 118863-3CHI100.out
(2) Velocity from SWMHYMO output 118863VD.out
(3) Depth of the cascading overflow was determined from the Calculation Sheet: Overflow From Typical Road Ponding Area provided in the February 2014 Technical Bulletin ISDTB-2014-01. For those areas which have a continuous road grade (or no dummy segment), the depth was taken from SWMHYMO VxD simulation.

Table 2.5 Summary of Cascading Flow during the 100 year 3 hour Chicago storm + 20%

Street	Drainage Area ID	Dummy Segment ID	Overflow (l/s)[1]	Velocity (m/s)[2]	Max. Static Ponding Depth (m)	Depth of Dynamic Flow (m)[3]	Max. Depth (Static + Dynamic) (m)	Velocity x Depth (m^2/s)
Michael Stoqua	S311A	N/A	66	0.79	N/A	0.05	0.05	0.04
Michael Stoqua	S310A	D14	33	0.61	0.29	0.06	0.35	0.04
Bareille-Snow	S309	N/A	71	0.57	N/A	0.06	0.06	0.03
Bareille-Snow	S308	N/A	216	1.15	N/A	0.08	0.08	0.09
Bareille-Snow	S308A	D18	268	1.29	0.26	0.13	**0.39**	0.17
Codd's	S340	N/A	98	1.04	N/A	0.05	0.05	0.06
Codd's	S231	N/A	165	0.71	N/A	0.08	0.08	0.06
Hemlock	S205C	N/A	46	0.51	N/A	0.05	0.05	0.03

Street	Drainage Area ID	Dummy Segment ID	Overflow (l/s)[1]	Velocity (m/s)[2]	Max. Static Ponding Depth (m)	Depth of Dynamic Flow (m)[3]	Max. Depth (Static + Dynamic) (m)	Velocity x Depth (m^2/s)
Hemlock	S207	N/A	89	0.60	N/A	0.07	0.07	0.04

(1) Overflow from DDSWMM output 118863-3CHI120.out
(2) Velocity from SWMHYMO output 118863VD.out
(3) Depth of the cascading overflow was determined from the Calculation Sheet: Overflow From Typical Road Ponding Area provided in the February 2014 Technical Bulletin ISDTB-2014-01. For those areas which have a continuous road grade (or no dummy segment), the depth was taken from SWMHYMO VxD simulation.

During the 100 year 3 hour Chicago storm, the summation of depth of ponding and depth of cascading flow for all street segments is less than the City guideline of 0.35 m. The product of depth and velocity is also less than the City guideline of 0.6 m^2/s.

During the sensitivity analysis applying the 100 year 3 hour Chicago storm increased by 20%, the summation of depth of ponding and depth of cascading flow for all street segments is less than the City guideline of 0.35 m, with the exception of S308A, noted in the above table in bold red type. At all locations, the product of depth and velocity is less than the City guideline of 0.6 m^2/s.

These results are consistent with those of the Phase 2B detailed design. It should be noted that major flow from the above-noted affected areas is at or below that accounted for in the Phase 2B model.

The area at which total depth of ponding and cascading flow exceeds 0.35 m during the stress test is noted in the below table with the critical adjacent property elevation.

Table 2.6 Critical Ponding Locations during the Stress Test and Adjacent Property Elevations

Drainage Area ID	Low Point Elevation (m)	Max. Depth (Static + Dynamic) (m)	(1) Corresponding Elevation (m)	(2) Adjacent Property Line (m)	Difference (2) – (1)
S308A	88.74	0.39	89.13	89.01	-0.12

The corresponding stress test ponding elevation is greater than the adjacent block grading at the boulevard. At the detailed design stage of the blocks, house openings must be greater than the ponding elevation.

2.5 Storm Hydraulic Grade Line Analysis

The hydraulic grade line (HGL) was evaluated using the XPSWMM hydraulic model. The existing overall model for the Wateridge site, most recently revised as part of the Phase 4 submission (December 2021), was revised to include the revised servicing of Parcels 1-5.

XPSWMM simulations were conducted for the 100 year 3 hour Chicago storm to ensure that the HGL is at least 0.3 m below the underside of footing elevations. A sensitivity analysis was also performed using the 100 year Chicago storm with a 20% increase in intensity to ensure that there is no severe flooding to properties. Hydraulic grade line elevations along the existing downstream Phase 1A trunk storm sewer and relevant Phase 2B storm sewers are presented in the below table for these storms, along with a comparison of underside of footing (USF) elevations. Results for the overall development area are presented in the enclosed **Appendix A**, including for the three historical storms per OSDG. Refer to **Figure 1** for the location of storm maintenance holes.

Table 2.7 Storm Hydraulic Grade Line – Phase 1A Trunk and Relevant Phase 2B Storm Sewers

MH ID	Street	Proposed Ground Elev. (m)	USF (m)	100 year 3 hour Chicago		100 year 3 hour Chicago + 20%	
				HGL (m)	USF – HGL (m)	HGL (m)	USF – HGL (m)
MH194	*Top of the escarpment*	82.05	N/A	80.47	N/A	80.55	N/A
MH193	OSHEDINAA	84.68	82.68	81.12	1.56	81.28	1.40
MH192	OSHEDINAA	84.99	82.99	81.46	1.53	81.64	1.35
MH191	OSHEDINAA	85.76	83.76	81.72	2.04	81.93	1.83
MH190	OSHEDINAA	86.36	84.36	81.96	2.40	82.19	2.17
MH180	OSHEDINAA	86.96	84.96	82.27	2.69	82.77	2.19
MH178	HEMLOCK	89.00	86.60	83.41	3.19	83.47	3.13
MH176	HEMLOCK	88.03	85.63	83.77	1.86	83.85	1.78
MH231	CODD'S	89.81	87.41	85.61	1.79	85.64	1.77
MH305	CODD'S	91.00	88.60	86.54	2.06	86.56	2.04
MH207	HEMLOCK	88.53	86.13	84.65	1.48	84.65	1.48
MH206	HEMLOCK	89.10	86.70	85.65	1.05	85.65	1.05
MH308	BAREILLE-SNOW	89.68	87.28	86.88	0.40	86.69	0.59
MH309	BAREILLE-SNOW	90.15	87.75	87.44	0.31	87.08	0.67
MH205	HEMLOCK	89.35	86.95	85.86	1.09	85.88	1.07
MH310	MICHAEL STOCQUA	90.04	87.64	87.28	0.36	87.42	0.22
MH311	MICHAEL STOCQUA	90.69	88.29	87.44	0.85	87.56	0.73

Along the Phase 1A trunk and Phase 2B storm sewers presented above, a minimum 0.3 m clearance between the USF and HGL is maintained during the 100 year 3 hour Chicago storm and the HGL elevations remain below USF elevations during the sensitivity analysis. This is also true for the results for the remainder of the development area for additional storm simulations (enclosed in **Appendix A**).

2.6 Conclusion

The storm servicing of Blocks 11 and 12 was addressed during the detailed design of Phase 2B. The purpose of this evaluation is to assess the impact on the dual drainage system of discretizing Blocks 11 and 12 into Parcels 1-5 and the associated revisions to the storm servicing. The proposed minor and major connectivity of the five parcels is presented on **Figure 3** and minor system capture and required on-site storage is summarized in **Table 2.2**.

In terms of major flow, the depth and velocity of flow on streets adjacent to the five parcels was evaluated. City guidelines with respect to ponding during the minor system design storm, as well as maximum depth and velocity of flow are maintained. Major flow from the adjacent street segments is at or below that accounted for in the Phase 2B model.

With respect to minor flow, the hydraulic grade line evaluation was updated with the revised inflow hydrographs from the five parcels. Results indicate that a minimum 0.3 m clearance between the USF and HGL is maintained during the 100 year 3 hour Chicago storm and the HGL elevations remain below USF elevations during the sensitivity analysis.

It is therefore concluded that the proposed storm servicing to support Parcels 1-5 can be accommodated by the existing storm infrastructure.

3. Wastewater Outlet

3.1 Objective

The objective of this evaluation is to assess the impact on the existing wastewater system by the sub-division of Blocks 11 and 12 into five parcels. **Figure 4** shows the location of the subject site and the existing sanitary sewers which will be impacted by this change.

3.2 Existing Conditions

Development of Phase 2B included the construction of sanitary sewers in Codd's Road from MH231A to the MH340A and Bareille-Snow Street from BLK308A to MH304A. The sanitary sewer on Codd's Road was designed to capture wastewater flows from Block 12 and the sanitary sewer on Bareille-Snow Street was designed to capture wastewater flows from Block 11. The Bareille-Snow sewer outlets to a sanitary sewer in Hemlock Road. The latter sewer was designed in 2017, using the City's wastewater flow criteria in effect at that time and predicted a flow of 28.49 l/s tributary from the Bareille-Snow sewer. The Bareille-Snow sanitary sewer was designed in 2019 based on flow calculation criteria in effect at that time and predicted a slightly less flow of 25.17 l/s. A highlighted copy of the Phase 2B sanitary sewer design sheet is included in **Appendix B**. The spreadsheet has been highlighted to indicate the immediate downstream sewers on Codd's Road and Bareille-Snow Street. The flow calculations in the Phase 2B spreadsheet were based on the City of Ottawa's wastewater criteria in effect of that time (2019) and the block population densities noted in the Master Servicing Study.

3.3 Proposed Condition

Because of the sub-division of Blocks 11 and 12 into five parcels, less wastewater flow is now proposed to outlet to the Codd's Road sanitary sewer. The Phase 2B sewer designed assumed all Block 12 would outlet to that sewer but now only parcel 5 is proposed to outlet in that direction. No further analysis is therefore needed for the Codd's Road sewer.

Parcels 3 and 4, which represent the balance of Block 12, are now proposed to outlet to the existing sanitary sewer in Bareille-Snow Street and not the Codd's Road sewer. There is no proposed change to the wastewater outlet for parcels 1 and 2. The Phase 2B design assumed all Block 11 would outlet to the Bareille-Snow sewer. Consequently, the expected wastewater flows to the latter pipe will likely increase.

An analysis of the ability of the existing sanitary sewer system in Bareille-Snow Street to accommodate the flows from both Block 11 and 12 was completed. This analysis is included on the updated sanitary sewer spreadsheet included in **Appendix B**. The updated spreadsheet was based not only on the current City of Ottawa wastewater criteria, which came into effect in 2018 but also on the most current concept plans for the various parcels which are also included in **Appendix B**. The updated analysis includes the existing sewer system highlighted on the Phase 2B design sheet.

Based on the updated analysis, the calculated wastewater flows tributary to the Hemlock Road sewer from Bareille-Snow Street is 30.31 l/s. This shows a wastewater flow increase of 1.82 l/s as a result of re-directing wastewater flows from parcels 3 and 4 in Block 12. The capacity of that sewer is 88.83 l/s. The Phase 1B design of the sanitary sewer in Hemlock Road between Bareille-Snow Street and Codd's Road indicated a spare capacity in that sewer of about 58 l/s. For reference, a highlighted copy of the Phase 1B sanitary sewer design sheet is included in **Appendix B**.

3.4 Conclusion

The impact of re-directing wastewater flows from Block 12 to the Bareille-Snow Street sanitary sewer has been completed. Based on the analysis noted above, the existing wastewater system in Wateridge Village Phase 1B and 2B has sufficient available capacity to carry the re-directed flows from Block 12. It is therefore concluded that the existing sanitary sewers in Bareille-Snow Street, Codd's Road and Hemlock Road adjacent to the subject property can accommodate the re-direction of flows from Block 12.

Scale

N.T.S.

Project Title

STORM AND SANITARY SERVICING ASSESSMENT OF BLOCK 11 AND 12 WATERIDGE VILLAGE PHASE 2B

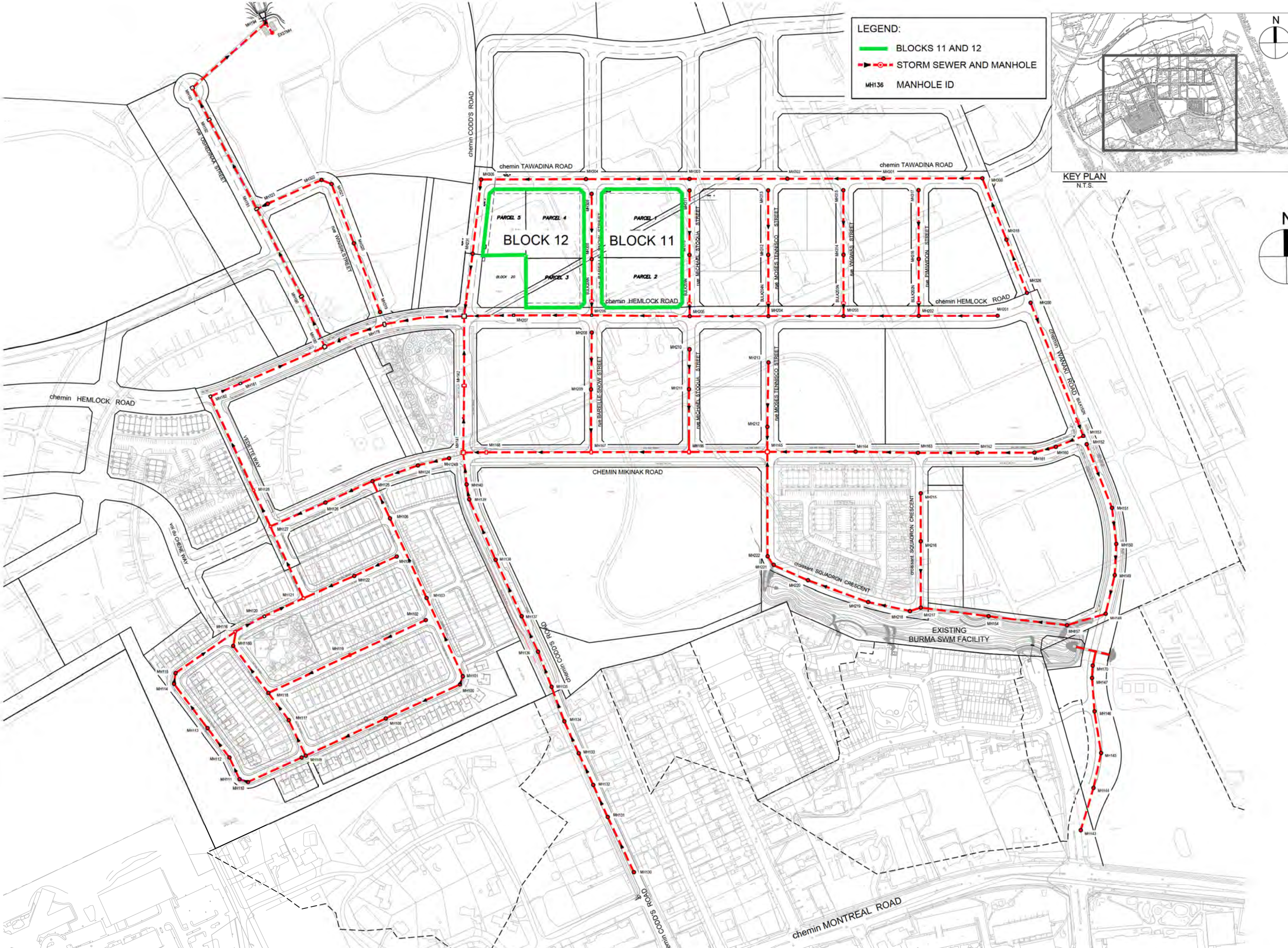
Drawing Title

LOCATION PLAN

Sheet No.

FIGURE 1

J:\38298--CFBRockcliffe\5.9 Drawings\59civil\SWM\FIGURES\BLOCK 11,12\FIGURE 1.dwg Layout Name: FIG1 Plot Style: AIA STANDARD COLOR-HALF.CTB Plotted At: 4/25/2022 5:40 PM Last Saved By: swalic, Apr. 25, 22



Scale

N.T.S.

Project Title

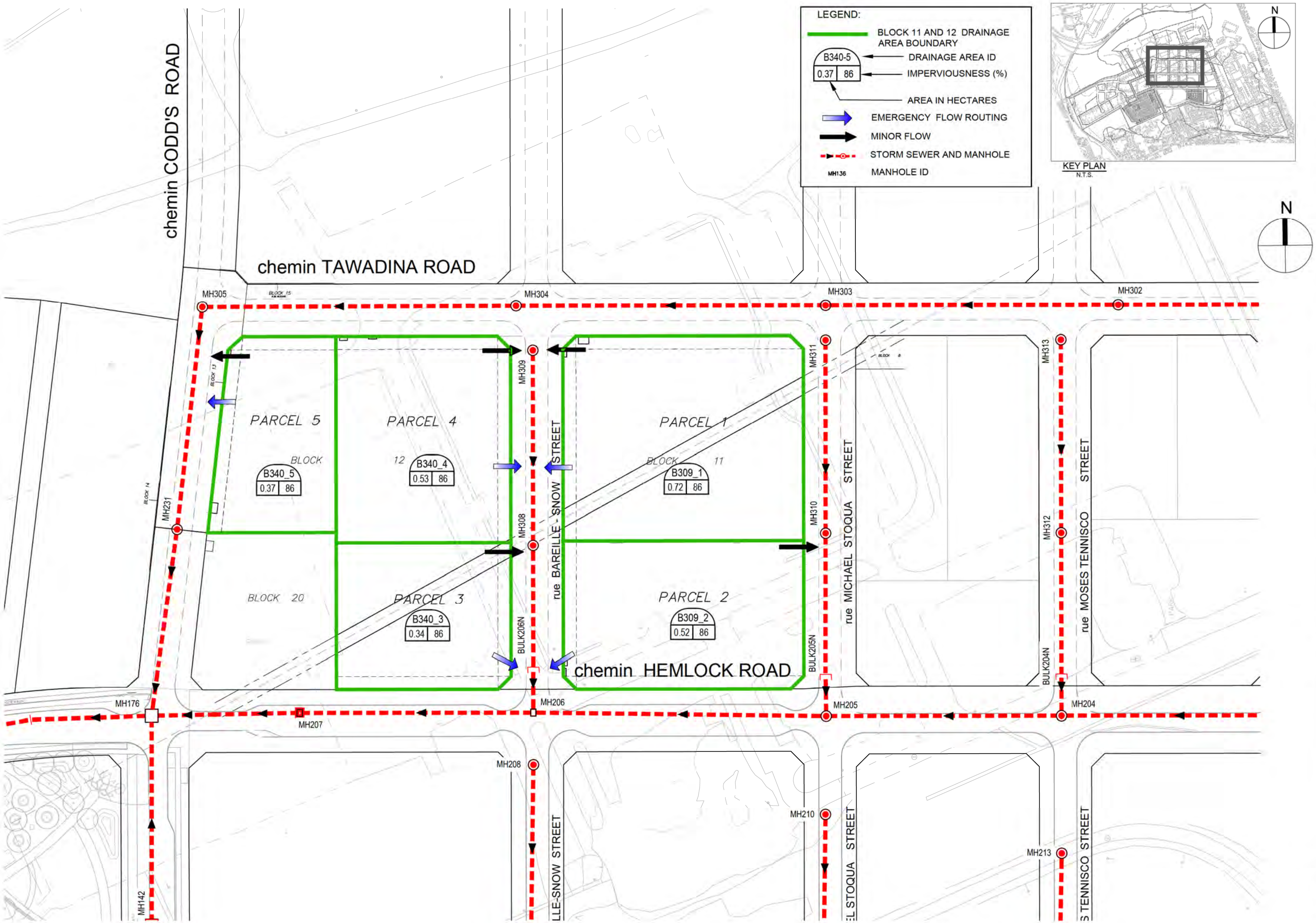
STORM AND SANITARY SERVICING ASSESSMENT OF BLOCK 11 AND 12 WATERIDGE VILLAGE PHASE 2B

Drawing Title

LOCATION PLAN AND STORM SEWER NETWORK

Sheet No.

FIGURE 2

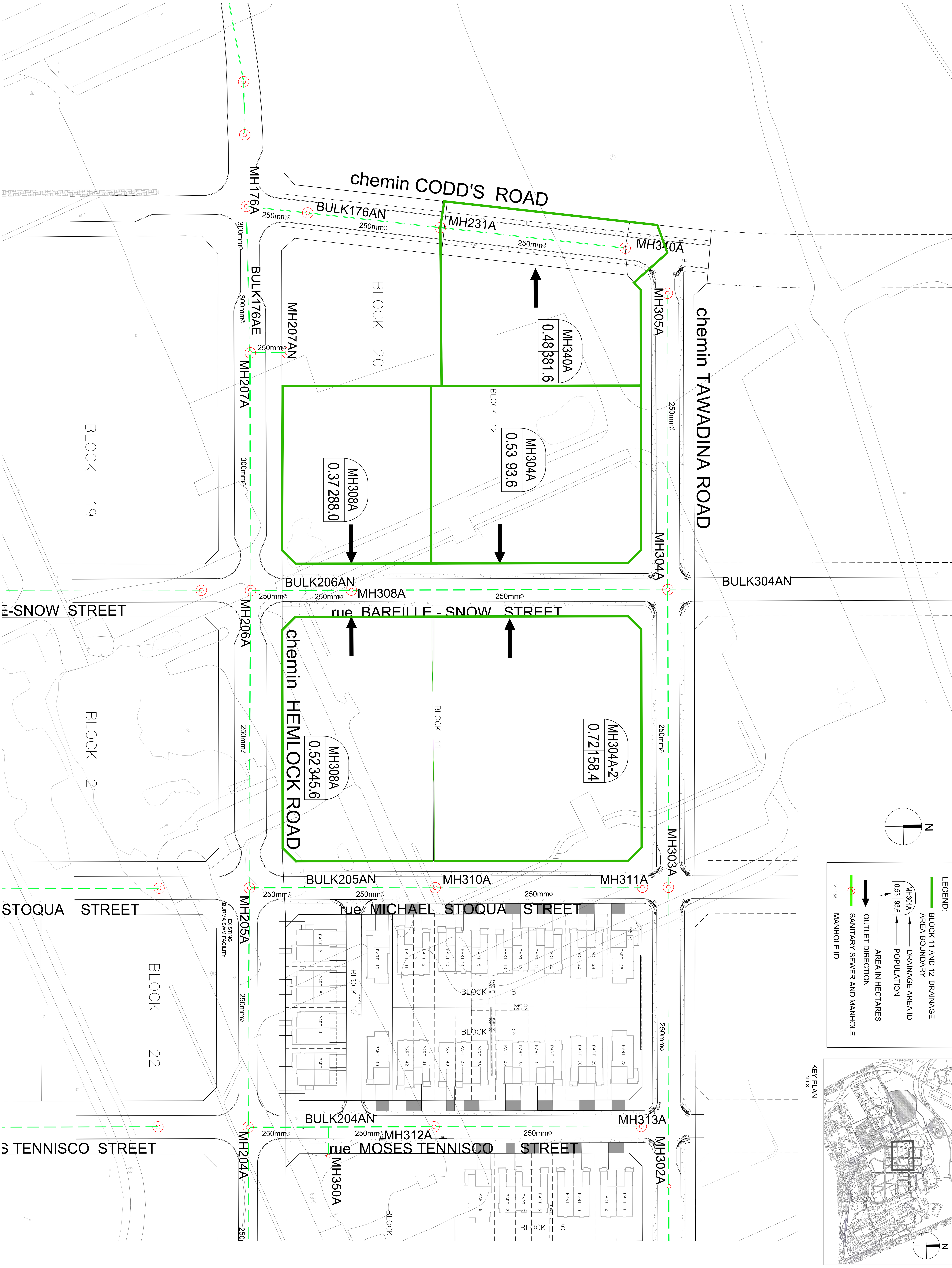


Scale
N.T.S.

Project Title
STORM AND SANITARY SERVICING ASSESSMENT OF BLOCK 11 AND 12 WATERIDGE VILLAGE PHASE 2B

Drawing Title
MINOR AND MAJOR SYSTEM CONNECTIVITY

Sheet No.
FIGURE 3



Sheet No.

FIGURE 4

Drawing Title

LOCATION PLAN
AND SANITARY SEWER
NETWORK

Project Title

STORM AND SANITARY SERVICING
ASSESSMENT OF BLOCK 11 AND 12
WATERIDGE VILLAGE PHASE 2B

Scale

N.T.S.

IBI

Appendix A

Supporting Storm Information

Summary of Model Files

DDSWMM:

5 year 3 hour Chicago: 118863-3CHI5.DAT
100 year 3 hour Chicago: 118863-3CHI100.DAT
100 year 3 hour Chicago + 20%: 118863-3CHI120.DAT

100 year 24 hour SCS Type II: 118863-24SCS100.DAT
100 year 24 hour SCS Type II + 20%: 118863-24SCS120.DAT

July 1979: 118863-JUL79.DAT
August 1988: 118863-AUG88.DAT
August 1996: 118863-Aug96.DAT

SWMHYMO VxD:

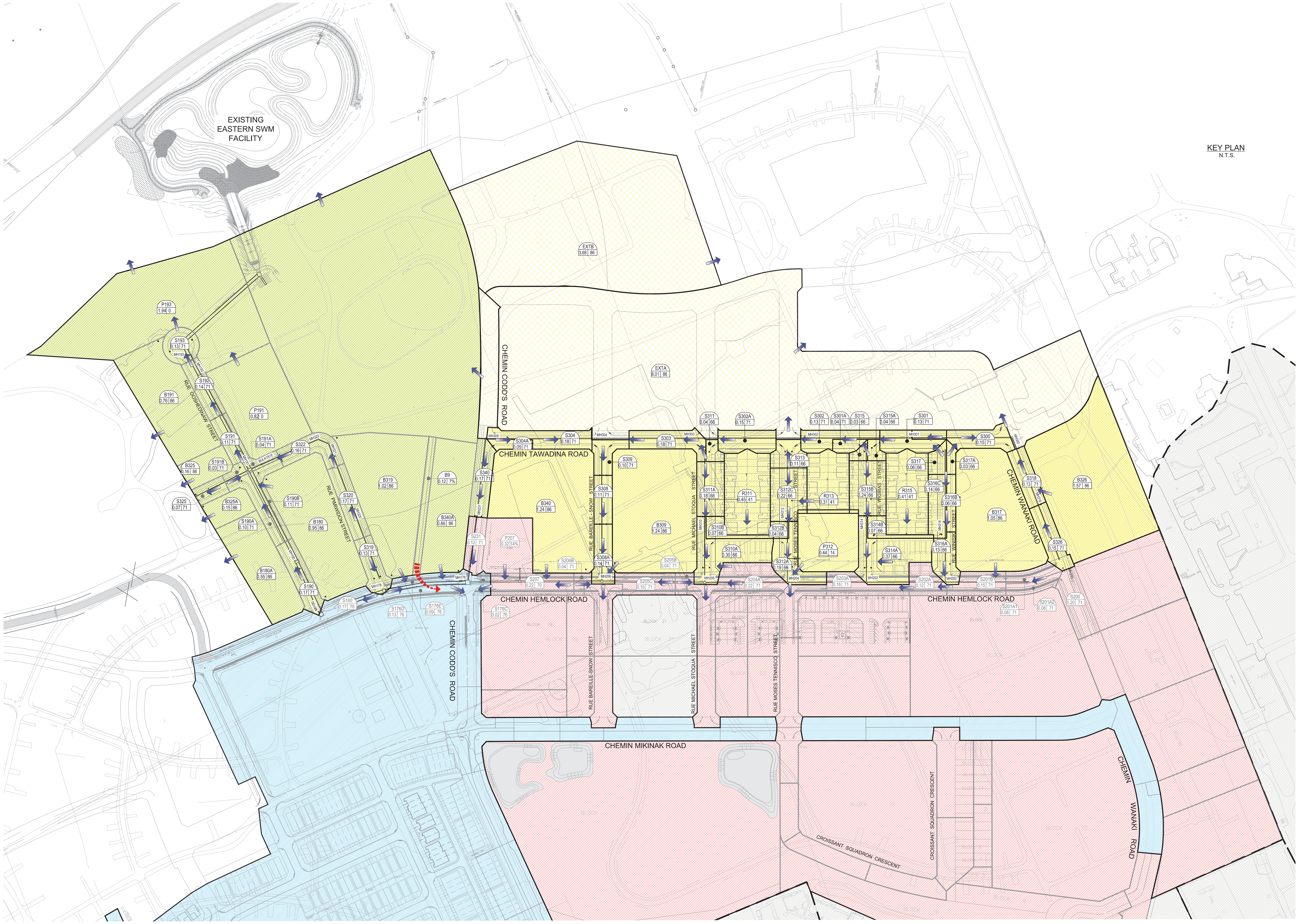
118863VD.dat

XPSWMM:

5 year 3 hour Chicago: 118863-3CHI5_BLK1112_V08_2022-03-15.XP
100 year 3 hour Chicago: 118863-3CHI100_BLK1112_V08_2022-02-28.XP
100 year 3 hour Chicago + 20%: 118863-3CHI120_BLK1112_V08_2022-02-28.XP

100 year 24 hour SCS Type II: 118863-24SCS100_BLK1112_V08_2022-03-15.XP
100 year 24 hour SCS Type II + 20%: 118863-24SCS120_BLK1112_V08_2022-03-15.XP

July 1979: 118863-JUL1979_BLK1112_V08_2022-03-15.XP
August 1988: 118863-AUG1988_BLK1112_V08_2022-03-15.XP
August 1996: 118863-AUG1996_BLK1112_V08_2022-03-15.XP



LEGEND:

- PHASE 2B DRAINAGE AREA
- PHASE 2A DRAINAGE AREA (FUTURE)
- PHASE 2C 2D DRAINAGE AREA (FUTURE)
- PHASE 1B DRAINAGE AREA (EXISTING)
- PHASE 1A DRAINAGE AREA (EXISTING)
- EXTERNAL DRAINAGE AREA

S318 — AREA ID; 71 — Imp.(%); 0.13 — AREA (ha)

- MAJOR FLOW
- TOTAL FLOW
- MH136 MANHOLE ID

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
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6			
5			
4			
3			
2			
1	SUBMISSION No.1 FOR CITY REVIEW	P.S.	2018:12:20

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Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE

PHASE 2B

M.S.BLACK 100101736 2019/04/17

Drawing Title

DDSWMM MODEL SCHEMATIC

Scale	1:2000
Design: M.B	Date: DEC. 2018
Drawn: S.V.	Checked: P.S.
Project No.: 118863	Drawing No.: 750

D07-16-15-0003

#17063

Velocity x Depth Calculation

Iteration equation:

Velocity:

$$v_x = v_{min} + \frac{Q_x - Q_{min}}{Q_{max} - Q_{min}} (v_{max} - v_{min})$$

Depth:

$$d_x = d_{min} + \frac{Q_x - Q_{min}}{Q_{max} - Q_{min}} (d_{max} - d_{min})$$

100 Year 3 Hour Chicago Storm																					
					SWMHYMO (118863VD.OUT)					Calculation Sheet: Overflow for Typical Road Ponding Area					SWMHYMO (118863VD.OUT)			Velocity x Depth	Maximum Static Ponding Depth	Total Depth (Static + Dynamic)
Area ID (Dummy Segment, if applicable)	Road ROW Section	Longitudinal Slope (%)	Overflow Flowrate		Flowrate (cms)		Velocity (m/s)			Flowrate (cms)		Depth (m)			Depth (m)					
			Qx (l/s)	Qx (cms)	Qmin	Qmax	vmin	vmax	vx	Qmin	Qmax	dmin	dmax	dx	dmin	dmax	dx	(m^2/s)	(m)	(m)
S311A	20	1.52	49	0.049	0.039	0.084	0.699	0.847	0.73	N/A	N/A	N/A	N/A	N/A	0.041	0.055	0.044	0.03	0.00	0.04
S310A	20	1.22	0	0.000	0.000	0.002	0.000	0.301	0.00	0.000	0.001	0.000	0.001	0.000	N/A	N/A	N/A	0.00	0.29	0.29
S309	20	0.60	43	0.043	0.024	0.053	0.439	0.532	0.50	N/A	N/A	N/A	N/A	N/A	0.041	0.055	0.050	0.03	0.00	0.05
S308	20	1.84	65	0.065	0.043	0.092	0.769	0.932	0.84	N/A	N/A	N/A	N/A	N/A	0.041	0.055	0.047	0.04	0.00	0.05
S308A	20	0.71	26	0.026	0.009	0.027	0.365	0.478	0.47	0.021	0.027	0.050	0.055	0.054	N/A	N/A	N/A	0.03	0.26	0.31
S340	20	2.40	50	0.050	0.049	0.105	0.878	1.064	0.88	N/A	N/A	N/A	N/A	N/A	0.041	0.055	0.041	0.04	0.00	0.04
S205C	24	0.71	37	0.037	0.024	0.053	0.439	0.532	0.48	N/A	N/A	N/A	N/A	N/A	0.041	0.055	0.047	0.02	0.00	0.05
S231	20	0.53	100	0.100	0.096	0.155	0.617	0.697	0.62	N/A	N/A	N/A	N/A	N/A	0.068	0.082	0.069	0.04	0.00	0.07
S207	24	0.51	61	0.061	0.053	0.096	0.532	0.617	0.55	N/A	N/A	N/A	N/A	N/A	0.055	0.068	0.057	0.03	0.00	0.06

Velocity x Depth Calculation

Iteration equation:

Velocity:

$$v_x = v_{min} + \frac{Q_x - Q_{min}}{Q_{max} - Q_{min}}(v_{max} - v_{min})$$

Depth:

$$d_x = d_{min} + \frac{Q_x - Q_{min}}{Q_{max} - Q_{min}}(d_{max} - d_{min})$$

100 Year 3 Hour Chicago Storm + 20%																				
					SWMHYMO (118863VD.OUT)					Calculation Sheet: Overflow for Typical Road Ponding Area					SWMHYMO (118863VD.OUT)			Velocity x Depth	Maximum Static Ponding Depth	Total Depth (Static + Dynamic)
Area ID (Dummy Segment, if applicable)	Road ROW Section	Longitudinal Slope (%)	Overflow Flowrate		Flowrate (cms)		Velocity (m/s)			Flowrate (cms)		Depth (m)			Depth (m)					
			Qx (l/s)	Qx (cms)	Qmin	Qmax	vmin	vmax	vx	Qmin	Qmax	dmin	dmax	dx	dmin	dmax	dx	(m^2/s)	(m)	(m)
S311A	20	1.52	**66**	0.066	0.039	0.084	0.699	0.847	**0.79**	N/A	N/A	N/A	N/A	**N/A**	0.041	0.055	**0.049**	**0.04**	0.00	0.05
S310A	20	1.22	**33**	0.033	0.012	0.035	0.478	0.626	**0.61**	0.028	0.035	0.055	0.060	**0.059**	N/A	N/A	**N/A**	**0.04**	0.29	0.35
S309	20	0.60	**71**	0.071	0.053	0.096	0.532	0.617	**0.57**	N/A	N/A	N/A	N/A	**N/A**	0.055	0.068	**0.060**	**0.03**	0.00	0.06
S308	20	1.84	**216**	0.216	0.167	0.272	1.081	1.221	**1.15**	N/A	N/A	N/A	N/A	**N/A**	0.068	0.082	**0.075**	**0.09**	0.00	0.07
S308A	20	0.71	**268**	0.268	0.255	0.364	0.841	0.919	**1.29**	0.240	0.269	0.125	0.130	**0.130**	N/A	N/A	**N/A**	**0.17**	0.26	0.39
S340	20	2.40	**98**	0.098	0.049	0.105	0.878	1.064	**1.04**	N/A	N/A	N/A	N/A	**N/A**	0.041	0.055	**0.053**	**0.06**	0.00	0.05
S205C	24	0.71	**46**	0.046	0.024	0.053	0.439	0.532	**0.51**	N/A	N/A	N/A	N/A	**N/A**	0.041	0.055	**0.052**	**0.03**	0.00	0.05
S231	20	0.53	**165**	0.165	0.155	0.234	0.697	0.773	**0.71**	N/A	N/A	N/A	N/A	**N/A**	0.082	0.095	**0.084**	**0.06**	0.00	0.08
S207	24	0.51	**89**	0.089	0.053	0.096	0.532	0.617	**0.60**	N/A	N/A	N/A	N/A	**N/A**	0.055	0.068	**0.066**	**0.04**	0.00	0.07

Storm Hydraulic Grade Line Elevations

XPSWMM NODE ID	MH NO.	PROPOSED GROUND ELEVATION (M)	USF (M)	100 YEAR 3 HOUR CHICAGO		100 YEAR 3 HOUR CHICAGO INCREASED BY 20%		100 YEAR 24 HOUR SCS TYPE II		100 YEAR 24 HOUR SCS TYPE II + 20%		JULY 1 1979		AUGUST 1988		AUGUST 1996	
				HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)
Phase 1B																	
S143	143	102.40	100.00	98.16	1.84	98.16	1.84	98.16	1.84	98.16	1.84	98.16	1.84	98.16	1.84	98.16	1.84
S144	144	99.41	97.01	95.79	1.22	95.79	1.22	95.78	1.23	95.79	1.22	95.78	1.23	95.79	1.22	95.78	1.23
S145	145	97.64	95.24	93.01	2.23	93.01	2.23	93.01	2.23	93.01	2.23	93.00	2.24	93.01	2.23	93.00	2.24
S146	146	95.28	92.88	90.96	1.92	91.82	1.06	90.77	2.11	91.26	1.62	90.91	1.97	91.01	1.87	90.63	2.25
S147	147	93.27	N/A	90.93	N/A	91.78	N/A	90.72	N/A	91.23	N/A	90.88	N/A	90.98	N/A	90.60	N/A
USBRM	N/A	N/A	N/A	90.88	N/A	91.72	N/A	90.67	N/A	91.17	N/A	90.83	N/A	90.93	N/A	90.56	N/A
BURMA	N/A	N/A	N/A	89.41	N/A	89.87	N/A	89.24	N/A	89.53	N/A	89.43	N/A	89.31	N/A	89.04	N/A
OUTLET	N/A	N/A	N/A	89.26	N/A	89.75	N/A	89.07	N/A	89.39	N/A	89.29	N/A	89.15	N/A	88.65	N/A
S152	152	92.73	90.33	89.71	0.62	89.71	0.62	89.71	0.62	89.71	0.62	89.71	0.62	89.71	0.62	89.71	0.62
S151	151	92.50	90.10	89.58	0.52	89.57	0.53	89.58	0.52	89.58	0.52	89.58	0.52	89.58	0.52	89.57	0.53
S150	150	92.32	89.92	89.49	0.43	89.48	0.44	89.49	0.43	89.49	0.43	89.49	0.43	89.49	0.43	89.49	0.43
S149	149	92.34	89.94	89.42	0.52	89.42	0.52	89.42	0.52	89.42	0.52	89.42	0.52	89.42	0.52	89.42	0.52
S148	148	92.14	89.74	89.30	0.44	89.29	0.45	89.30	0.44	89.30	0.44	89.30	0.44	89.30	0.44	89.30	0.44
S157	157	91.24	N/A	89.21	N/A	89.20	N/A	89.21	N/A	89.21	N/A	89.21	N/A	89.21	N/A	89.21	N/A
S154	154	91.02	N/A	87.68	N/A	87.68	N/A	87.68	N/A	87.68	N/A	87.68	N/A	87.68	N/A	87.68	N/A
S215	215	90.77	88.37	87.58	0.79	87.58	0.79	87.58	0.79	87.58	0.79	87.58	0.79	87.58	0.79	87.58	0.79
S216	216	90.85	88.45	87.30	1.15	87.30	1.15	87.30	1.15	87.30	1.15	87.30	1.15	87.31	1.14	87.30	1.15
S217	217	90.66	88.26	87.13	1.13	87.18	1.08	87.12	1.14	87.15	1.11	87.14	1.12	87.13	1.13	87.12	1.14
S218	218	90.40	88.00	87.04	0.96	87.10	0.90	87.02	0.98	87.06	0.94	87.05	0.95	87.04	0.96	87.02	0.98
S219	219	90.08	87.68	86.85	0.83	86.94	0.74	86.82	0.86	86.88	0.80	86.86	0.82	86.84	0.84	86.81	0.87
S220	220	89.86	87.46	86.74	0.72	86.84	0.62	86.70	0.76	86.78	0.68	86.75	0.71	86.72	0.74	86.68	0.78
S221	221	89.88	87.48	86.57	0.91	86.72	0.76	86.51	0.97	86.63	0.85	86.59	0.89	86.54	0.94	86.36	1.12
S222	222	89.86	87.46	86.38	1.08	86.51	0.95	86.32	1.14	86.43	1.03	86.39	1.07	86.35	1.11	86.19	1.27
S200	200	94.71	92.31	90.73	1.58	90.74	1.57	90.73	1.58	90.72	1.59	90.73	1.58	90.72	1.59	90.73	1.58
S214	214	93.52	91.12	90.26	0.86	90.28	0.84	90.26	0.86	90.27	0.85	90.26	0.86	90.26	0.86	90.26	0.86
MH201	201	94.29	91.89	90.72	1.17	90.73	1.16	90.72	1.17	90.72	1.17	90.72	1.17	90.72	1.17	90.71	1.18
MH202	202	93.91	91.51	90.42	1.09	90.43	1.08	90.41	1.10	90.42	1.09	90.41	1.10	90.41	1.10	90.40	1.11
MH203	203	92.38	89.98	88.66	1.32	88.68	1.30	88.63	1.35	88.66	1.32	88.63	1.35	88.64	1.34	88.61	1.37
MH204	204	90.40	88.00	87.08	0.92	87.10	0.90	87.06	0.94	87.08	0.92	87.06	0.94	87.07	0.93	87.02	0.98
MH205	205	89.35	86.95	85.86	1.09	85.88	1.07	85.83	1.12	85.86	1.09	85.84	1.11	85.84	1.11	85.77	1.18
MH206	206	89.10	86.70	85.65	1.05	85.65	1.05	85.62	1.08	85.65	1.05	85.63	1.07	85.63	1.07	85.57	1.13
MH207	207	88.53	86.13	84.65	1.48	84.65	1.48	84.62	1.51	84.65	1.48	84.63	1.50	84.64	1.49	84.58	1.55
S212	212	90.25	87.85	86.86	0.99	86.87	0.98	86.83	1.02	86.85	1.00	86.83	1.02	86.84	1.01	86.82	1.03
S213	213	89.74	87.34	86.45	0.89	86.45	0.89	86.43	0.91	86.45	0.89	86.44	0.90	86.44	0.90	86.42	0.92
S210	210	89.14	86.74	86.43	0.31	86.43	0.31	86.42	0.32	86.43	0.31	86.42	0.32	86.43	0.31	86.41	0.33
S211	211	89.15	86.75	85.94	0.81	85.93	0.82	85.93	0.82	85.94	0.81	85.93	0.82	85.93	0.82	85.92	0.83
S208	208	88.77	86.37	85.92	0.45	85.91	0.46	85.78	0.59	85.91	0.46	85.81	0.56	85.88	0.49	85.70	0.67
S209	209	88.75	86.35	85.46	0.89	85.45	0.90	85.41	0.94	85.46	0.89	85.42	0.93	85.45	0.90	85.38	0.97
MH231	231	89.81	87.41	85.61	1.79	85.64	1.77	85.73	1.67	85.78	1.63	85.84	1.57	85.77	1.63	85.71	1.69

Storm Hydraulic Grade Line Elevations

XPSWMM NODE ID	MH NO.	PROPOSED GROUND ELEVATION (M)	USF (M)	100 YEAR 3 HOUR CHICAGO		100 YEAR 3 HOUR CHICAGO INCREASED BY 20%		100 YEAR 24 HOUR SCS TYPE II		100 YEAR 24 HOUR SCS TYPE II + 20%		JULY 1 1979		AUGUST 1988		AUGUST 1996	
				HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)
Wateridge Village Phase 1A																	
S153	153	92.78	90.38	89.45	0.93	89.46	0.92	89.44	0.94	89.45	0.93	89.44	0.94	89.45	0.93	89.44	0.94
S160	160	92.27	89.87	89.01	0.86	89.02	0.85	89.01	0.86	89.01	0.86	89.01	0.86	89.01	0.86	89.00	0.87
S161	161	91.94	89.54	88.57	0.97	88.58	0.96	88.57	0.97	88.57	0.97	88.57	0.97	88.57	0.97	88.57	0.97
S162	162	91.34	88.94	88.26	0.68	88.26	0.68	88.25	0.69	88.26	0.68	88.25	0.69	88.26	0.68	88.25	0.69
S163	163	90.94	88.54	87.68	0.86	87.68	0.86	87.68	0.86	87.68	0.86	87.68	0.86	87.68	0.86	87.68	0.86
S164	164	90.22	87.82	87.00	0.82	87.01	0.81	86.99	0.83	87.00	0.82	87.00	0.82	87.00	0.82	86.99	0.83
S165B	165	89.61	87.21	86.45	0.76	86.45	0.76	86.44	0.77	86.44	0.77	86.44	0.77	86.44	0.77	86.44	0.77
S165	165	89.30	86.90	85.98	0.92	86.05	0.85	85.93	0.97	86.01	0.89	85.99	0.91	85.96	0.94	85.83	1.07
S166	166	88.90	86.50	84.88	1.62	85.03	1.47	84.78	1.72	84.93	1.57	84.88	1.62	84.85	1.65	84.59	1.91
S167	167	88.40	86.00	84.71	1.29	84.86	1.14	84.60	1.40	84.76	1.24	84.71	1.29	84.67	1.33	84.39	1.61
S168	168	87.70	85.30	84.54	0.76	84.66	0.64	84.43	0.87	84.58	0.72	84.54	0.76	84.50	0.80	84.22	1.08
S141	141	87.32	84.92	84.28	0.64	84.39	0.53	84.18	0.74	84.32	0.60	84.28	0.64	84.25	0.67	83.97	0.95
S142	142	87.52	85.12	84.02	1.10	84.12	1.00	83.94	1.18	84.06	1.06	84.03	1.09	84.00	1.12	83.74	1.38
MH176	176	88.03	85.63	83.77	1.86	83.85	1.78	83.69	1.94	83.80	1.83	83.77	1.86	83.75	1.88	83.49	2.14
MH178	178	89.00	86.60	83.41	3.19	83.47	3.13	83.34	3.26	83.44	3.16	83.41	3.19	83.39	3.21	83.18	3.42
MH180	180	88.23	85.83	82.20	3.62	82.44	3.38	81.98	3.84	82.27	3.56	82.21	3.62	82.10	3.73	81.49	4.34
MH190	190	88.10	85.70	81.90	3.80	82.12	3.58	81.65	4.05	81.97	3.73	81.91	3.79	81.80	3.90	81.23	4.47
MH191	191	86.36	83.96	81.66	2.30	81.86	2.10	81.44	2.52	81.73	2.23	81.67	2.29	81.56	2.40	81.06	2.91
MH192	192	85.92	83.52	81.41	2.11	81.59	1.93	81.21	2.31	81.47	2.05	81.41	2.11	81.31	2.21	80.89	2.63
MH193	193	84.85	82.45	81.09	1.36	81.24	1.21	80.92	1.53	81.14	1.31	81.09	1.36	81.00	1.45	80.60	1.85
MH194	194	82.44	N/A	80.45	N/A	80.53	N/A	80.35	N/A	80.48	N/A	80.46	N/A	80.40	N/A	80.13	N/A
S130	130		N/A	101.25	N/A	101.25	N/A	101.24	N/A	101.25	N/A	101.24	N/A	101.24	N/A	101.23	N/A
S131	131		N/A	101.05	N/A	101.05	N/A	101.04	N/A	101.05	N/A	101.04	N/A	101.04	N/A	101.03	N/A
S132	132		N/A	99.64	N/A	99.64	N/A	99.64	N/A	99.64	N/A	99.64	N/A	99.64	N/A	99.63	N/A
S133	133		N/A	96.52	N/A	96.52	N/A	96.51	N/A	96.52	N/A	96.51	N/A	96.51	N/A	96.50	N/A
S134	134		N/A	93.01	N/A	93.01	N/A	93.00	N/A	93.01	N/A	93.00	N/A	93.00	N/A	92.99	N/A
S135	135		N/A	90.11	N/A	90.11	N/A	90.10	N/A	90.11	N/A	90.10	N/A	90.10	N/A	90.09	N/A
S136	136		N/A	87.38	N/A	87.38	N/A	87.37	N/A	87.38	N/A	87.37	N/A	87.37	N/A	87.37	N/A
S137	137		86.91	85.77	1.14	85.77	1.14	85.76	1.15	85.77	1.14	85.76	1.15	85.77	1.14	85.76	1.15
S138	138		86.31	84.96	1.35	84.96	1.35	84.95	1.36	84.96	1.35	84.95	1.36	84.95	1.36	84.94	1.37
S139	139		85.66	84.46	1.20	84.48	1.18	84.46	1.20	84.46	1.20	84.46	1.20	84.46	1.20	84.45	1.21
S140	140		N/A	84.35	N/A	84.42	N/A	84.34	N/A	84.37	N/A	84.35	N/A	84.34	N/A	84.34	N/A
S100	100		87.16	85.70	1.46	85.69	1.47	85.70	1.46	85.70	1.46	85.70	1.46	85.70	1.46	85.70	1.46
S108	108		86.66	85.24	1.43	85.23	1.43	85.23	1.43	85.24	1.42	85.23	1.43	85.23	1.43	85.23	1.43
S109	109		85.36	84.05	1.31	84.05	1.31	84.05	1.31	84.05	1.31	84.05	1.31	84.05	1.31	84.05	1.31
S117	117		85.06	83.54	1.52	83.58	1.48	83.53	1.53	83.54	1.52	83.53	1.53	83.54	1.52	83.53	1.53
S118	118		84.71	83.21	1.50	83.48	1.23	83.20	1.51	83.25	1.46	83.22	1.49	83.21	1.50	83.20	1.51
S101	101		87.16	85.55	1.61	85.55	1.61	85.54	1.62	85.55	1.61	85.54	1.62	85.54	1.62	85.54	1.62
S102	102		86.46	84.72	1.74	84.72	1.74	84.71	1.75	84.72	1.74	84.71	1.75	84.71	1.75	84.70	1.76
S119	119		85.46	83.95	1.51	83.95	1.51	83.95	1.51	83.95	1.51	83.94	1.52	83.95	1.51	83.95	1.51
S104	104		N/A	85.90	N/A	85.89	N/A	85.89	N/A	85.90	N/A	85.89	N/A	85.89	N/A	85.88	N/A

Storm Hydraulic Grade Line Elevations

XPSWMM NODE ID	MH NO.	PROPOSED GROUND ELEVATION (M)	USF (M)	100 YEAR 3 HOUR CHICAGO		100 YEAR 3 HOUR CHICAGO INCREASED BY 20%		100 YEAR 24 HOUR SCS TYPE II		100 YEAR 24 HOUR SCS TYPE II + 20%		JULY 1 1979		AUGUST 1988		AUGUST 1996	
				HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)
S103	103		86.46	84.36	2.10	84.36	2.10	84.34	2.12	84.36	2.10	84.35	2.11	84.35	2.11	84.34	2.12
S105	105		85.71	83.90	1.81	83.91	1.80	83.89	1.82	83.90	1.81	83.89	1.82	83.90	1.81	83.89	1.82
S122	122		84.86	83.53	1.33	83.53	1.33	83.53	1.33	83.53	1.33	83.53	1.33	83.53	1.33	83.53	1.33
S121	121		84.26	82.80	1.46	83.03	1.23	82.43	1.83	82.82	1.44	82.77	1.49	82.61	1.65	81.98	2.28
S127	127		84.36	82.67	1.69	82.92	1.44	82.34	2.02	82.71	1.65	82.66	1.70	82.51	1.85	81.85	2.51
S128	128		N/A	82.61	N/A	82.86	N/A	82.30	N/A	82.67	N/A	82.61	N/A	82.47	N/A	81.81	N/A
S107	107		N/A	85.29	N/A	85.29	N/A	85.28	N/A	85.29	N/A	85.28	N/A	85.28	N/A	85.27	N/A
S106	106		85.61	83.76	1.85	83.75	1.86	83.73	1.88	83.76	1.85	83.74	1.87	83.75	1.86	83.73	1.88
S124	124		85.69	83.94	1.75	83.94	1.75	83.93	1.76	83.94	1.75	83.93	1.76	83.93	1.76	83.92	1.77
S125	125		85.34	83.37	1.97	83.38	1.96	83.35	1.99	83.37	1.97	83.36	1.98	83.36	1.98	83.35	1.99
S126	126		84.96	82.87	2.09	83.14	1.82	82.85	2.11	82.89	2.07	82.85	2.11	82.86	2.10	82.84	2.12
S182	182		N/A	82.46	N/A	82.70	N/A	82.18	N/A	82.52	N/A	82.46	N/A	82.32	N/A	81.68	N/A
S181	181		N/A	82.36	N/A	82.61	N/A	82.11	N/A	82.43	N/A	82.37	N/A	82.24	N/A	81.61	N/A
S110	110		85.56	83.59	1.97	83.80	1.76	83.59	1.97	83.59	1.97	83.59	1.97	83.59	1.97	83.59	1.97
S111	111		84.96	83.59	1.37	83.80	1.16	83.58	1.38	83.59	1.37	83.58	1.38	83.59	1.37	83.58	1.38
S112	112		84.91	83.40	1.52	83.77	1.14	83.18	1.73	83.50	1.41	83.42	1.49	83.22	1.69	83.22	1.69
S113	113		84.51	83.41	1.10	83.74	0.77	83.06	1.45	83.48	1.03	83.40	1.11	83.08	1.43	83.05	1.46
S114	114		83.91	83.06	0.85	83.31	0.60	82.66	1.25	83.11	0.80	83.04	0.87	82.85	1.06	82.49	1.42
S115	115		83.56	83.04	0.52	83.33	0.23	82.64	0.92	83.13	0.43	83.01	0.55	82.83	0.73	82.45	1.11
S116	116		83.71	82.88	0.83	83.16	0.55	82.51	1.20	82.92	0.79	82.85	0.86	82.70	1.01	82.10	1.61
S120	120		83.96	82.86	1.10	83.08	0.88	82.48	1.48	82.88	1.08	82.83	1.13	82.67	1.29	82.06	1.90

Storm Hydraulic Grade Line Elevations

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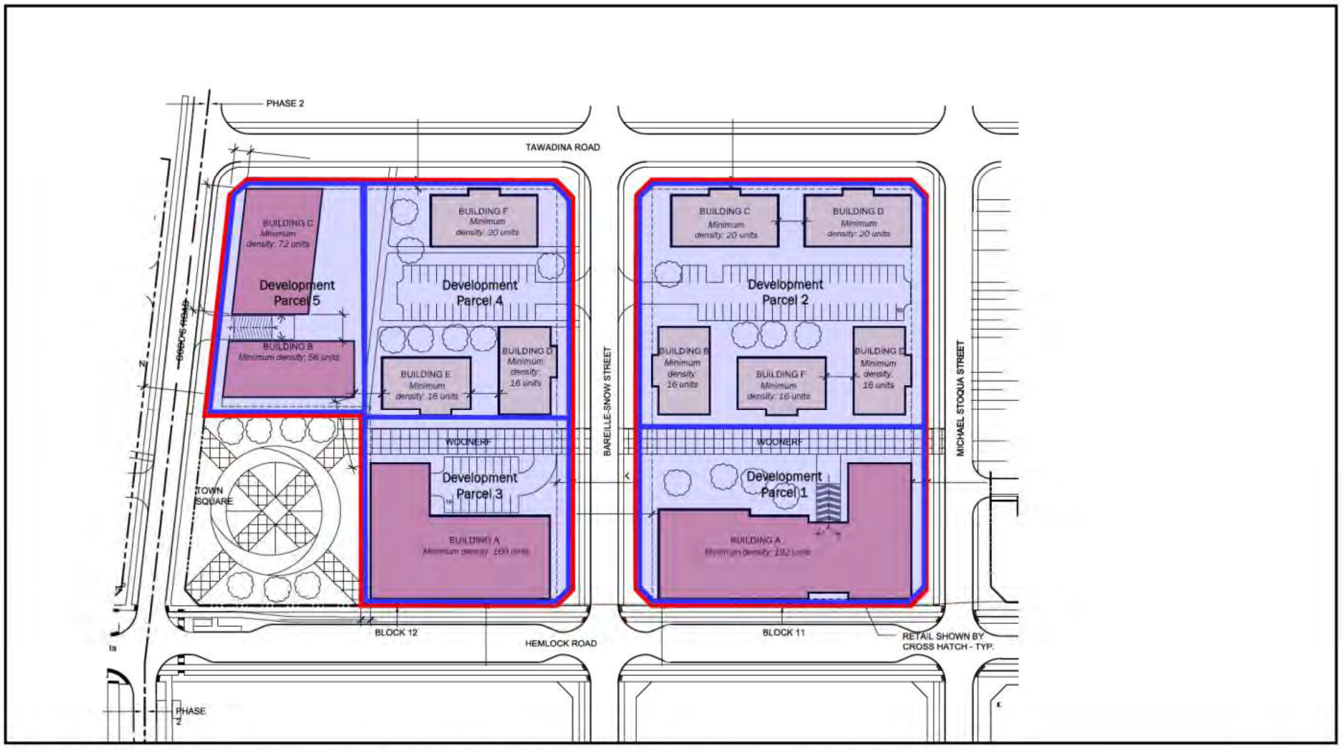
				HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)
Phase 2B, 4																	
MH317	317	94.08	91.68	91.17	0.51	91.18	0.50	91.14	0.54	91.15	0.53	91.15	0.53	91.14	0.54	91.11	0.57
MH316	316	94.09	91.69	90.96	0.73	90.96	0.73	90.95	0.74	90.95	0.74	90.95	0.74	90.95	0.74	90.92	0.77
MH315	315	93.39	91.36	90.28	1.08	90.29	1.07	90.25	1.11	90.26	1.10	90.27	1.09	90.27	1.09	90.26	1.10
MH314	314	93.00	91.16	89.91	1.25	89.91	1.25	89.91	1.25	89.91	1.25	89.91	1.25	89.91	1.25	89.89	1.27
MH313	313	92.62	90.71	89.35	1.36	89.34	1.37	89.35	1.36	89.35	1.36	89.35	1.36	89.35	1.36	89.34	1.37
MH312	312	91.36	89.68	88.42	1.26	88.42	1.26	88.41	1.27	88.42	1.26	88.42	1.26	88.42	1.26	88.38	1.30
MH311	311	90.69	88.29	87.44	0.85	87.56	0.73	87.40	0.89	87.48	0.81	87.45	0.84	87.47	0.82	87.38	0.91
MH310	310	90.04	87.64	87.28	0.36	87.42	0.22	87.25	0.39	87.35	0.29	87.30	0.34	87.33	0.31	87.06	0.58
MH309	309	90.15	87.75	87.44	0.31	87.08	0.67	87.33	0.42	87.44	0.31	87.41	0.34	87.43	0.32	87.22	0.53
MH308	308	89.68	87.28	86.88	0.40	86.69	0.59	86.81	0.47	86.88	0.40	86.87	0.41	86.88	0.40	86.76	0.52
MH326	326	94.76	92.36	91.33	1.03	91.33	1.03	91.32	1.04	91.32	1.04	91.32	1.04	91.32	1.04	91.33	1.03
MH318	318	94.40	92.00	91.03	0.97	91.03	0.97	91.00	1.00	91.03	0.97	91.00	1.00	91.00	1.00	91.00	1.00
MH300	300	94.00	91.60	90.71	0.89	90.70	0.90	90.67	0.93	90.70	0.90	90.68	0.92	90.68	0.92	90.68	0.92
MH301	301	93.73	91.33	90.21	1.12	90.21	1.12	90.20	1.13	90.20	1.13	90.21	1.12	90.20	1.13	90.20	1.13
MH302	302	92.80	90.40	88.64	1.76	88.64	1.76	88.63	1.77	88.63	1.77	88.64	1.76	88.63	1.77	88.63	1.77
MH303	303	90.67	88.27	87.80	0.47	87.81	0.46	87.63	0.64	87.65	0.62	87.79	0.48	87.72	0.55	87.64	0.63
MH304	304	90.30	87.90	87.39	0.51	87.38	0.52	87.30	0.60	87.31	0.59	87.38	0.52	87.34	0.56	87.30	0.60
MH305	305	91.00	88.60	86.54	2.06	86.56	2.04	86.61	1.99	86.64	1.96	86.69	1.91	86.65	1.95	86.60	2.00
MH319	319	88.81	86.61	86.13	0.48	86.12	0.49	86.12	0.49	86.13	0.48	86.12	0.49	86.12	0.49	86.12	0.49
MH320	320	89.12	86.92	85.49	1.43	85.49	1.43	85.49	1.43	85.49	1.43	85.49	1.43	85.49	1.43	85.49	1.43
MH321	321	87.67	85.47	84.18	1.29	84.39	1.08	84.10	1.37	84.15	1.32	84.11	1.36	84.13	1.34	84.09	1.38
MH322	322	87.50	85.30	84.18	1.12	84.39	0.91	84.10	1.20	84.15	1.15	84.10	1.20	84.12	1.18	84.09	1.21
MH323	323	86.57	84.37	83.40	0.97	83.48	0.89	83.31	1.06	83.37	1.00	83.32	1.05	83.34	1.03	83.30	1.07

Appendix B

Supporting Sanitary Information

SCHEDULE "A"

PARCEL IDENTIFICATION, DESCRIPTION, AND MINIMUM DENSITY[1]



**Boundaries of the development parcels are estimated. Purchasers to provide dimensioned sketch or electronic survey to confirm these boundaries

[1] This image if provided for demonstration purposes only

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Block 11&12 Proposed Conditions
Old Criteria being used

AS-BUILT SANITARY SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Canada Lands Company

LOCATION				RESIDENTIAL										ICI AREAS							INFILTRATION ALLOWANCE			FIXED	TOTAL	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		PEAK	PEAK	AREA (Ha)						PEAK	AREA (Ha)		FLOW	FLOW	FLOW	CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH	Phase 1B (Ha)	SF	SD	TH	APT	EXTERNAL (Ha)	IND	CUM	FACTOR	FLOW (L/s)	INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	FLOW (L/s)	IND	CUM	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
Phase 1B																																
rue Michael Stoqua Street	EX205A	BULK205AN	MH205A						0.66	33.1	33.1	4.00	0.54		0.00		0.00		0.00	0.00	0.66	0.66	0.18	0.00	0.72	66.24	21.00	250	1.14	1.307	65.52	98.91%
Hemlock Road	205A	MH205A	MH206A	0.25						0.0	186.6	4.00	3.02		0.00		0.00		0.00	0.00	0.25	2.51	0.70	0.00	3.73	31.02	111.90	250	0.25	0.612	27.29	87.99%
rue Bareille-Snow Street	EX206A-B	BULK206AN	MH206A						9.79	2598.3	2598.3	3.49	36.78		0.00		0.00		0.00	0.00	9.79	9.79	2.74	0.00	39.52	88.83	21.00	250	2.05	1.753	49.30	55.50%
Hemlock Road	206A	MH206A	MH207A	0.20						0.0	2784.9	3.47	39.14		0.00		0.00		0.00	0.00	0.20	12.50	3.50	0.00	42.64	100.88	89.30	300	1.00	1.383	58.24	57.73%
Block 20	PARK1	MH207AN	MH207A	0.32						0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.32	0.32	0.09	0.00	0.09	50.02	13.80	250	0.65	0.987	49.93	99.82%
Hemlock Road	PARK1, 207A	MH207A	BULK176AE	0.12						0.0	2784.9	3.47	39.14		0.00		0.00		0.00	0.00	0.12	12.94	3.62	0.00	42.77	134.59	33.10	300	1.78	1.845	91.83	68.23%
Phase 1A																																
Hemlock Road		*BULK176AE*	*MH176A*							0.0	2784.9	3.47	39.14		0.00		0.00		0.00	0.00	0.00	12.94	3.62	0.00	42.77	65.38	21.97	300	0.42	0.896	22.61	34.59%
Phase 1B																																
chemin Wanaki Road	200A, COM1	MH200A	MH214A	0.25						0.0	0.0	4.00	0.00		0.00	0.90	0.90		0.00	0.78	1.15	1.15	0.32	0.00	1.10	71.01	98.50	250	1.31	1.401	69.90	98.45%
chemin Wanaki Road	214A, COM2	MH214A	BULK153AN	0.16						0.0	0.0	4.00	0.00		0.00	0.65	1.55		0.00	1.35	0.81	1.96	0.55	0.00	1.89	57.20	44.60	250	0.85	1.129	55.30	96.69%
Phase 1A																																
chemin Wanaki Road	COM2	*BULK153AN*	*MH153A*							0.0	0.0	4.00	0.00		0.00		1.55		0.00	1.35	0.00	1.96	0.55	0.00	1.89	51.91	20.13	250	0.70	1.024	50.01	96.35%
chemin Wanaki Road	153A, COM3	*MH153A*	*MH151A*	0.21						0.0	0.0	4.00	0.00		0.00	0.88	2.43		0.00	2.11	1.09	3.05	0.85	0.00	2.96	36.70	85.04	250	0.35	0.724	33.74	91.93%
chemin Wanaki Road	151A, COM4	*MH151A*	*MH150A*	0.11						0.0	0.0	4.00	0.00		0.00	0.45	2.88		0.00	2.50	0.56	3.61	1.01	0.00	3.51	36.70	40.97	250	0.35	0.724	33.19	90.43%
chemin Wanaki Road	150A, COM5	*MH150A*	*MH149A*	0.11						0.0	0.0	4.00	0.00		0.00	0.95	3.83		0.00	3.32	1.06	4.67	1.31	0.00	4.63	36.70	41.34	250	0.35	0.724	32.07	87.38%
chemin Wanaki Road	149A	*MH149A*	*MH148A*	0.10						0.0	0.0	4.00	0.00		0.00		3.83		0.00	3.32	0.10	4.77	1.34	0.00	4.66	36.70	40.04	250	0.35	0.724	32.04	87.30%
chemin Wanaki Road	148A	*MH148A*	*MH157A*	0.04						0.0	0.0	4.00	0.00		0.00		3.83		0.00	3.32	0.04	4.81	1.35	0.00	4.67	36.70	20.58	250	0.35	0.724	32.03	87.27%
Phase 1B																																
chemin Wanaki Road	143B	BULK143AE	MH143A	0.31						104.0	104.0	4.00	1.69		0.00		0.00		0.00	0.00	0.31	0.31	0.09	0.00	1.77	43.87	21.50	250	0.50	0.866	42.10	95.96%
chemin Wanaki Road	143A	MH143A	MH144A	0.27						0.0	104.0	4.00	1.69		0.00		0.00		0.00	0.00	0.27	0.58	0.16	0.00	1.85	83.69	34.70	250	1.82	1.652	81.85	97.79%
chemin Wanaki Road	144A, 144B	MH144A	MH145A	0.72						0.0	104.0	4.00	1.69		0.00		0.00		0.00	0.00	0.72	1.30	0.36	0.00	2.05	88.61	41.10	250	2.04	1.749	86.56	97.69%
chemin Wanaki Road	145A, 145B, 145C	MH145A	MH146A	2.77						835.6	939.6	3.82	14.53		0.00		0.00		0.00	0.00	2.77	4.07	1.14	0.00	15.67	105.83	53.30	250	2.91	2.089	90.16	85.19%
chemin Wanaki Road	146A	MH146A	MH147A	0.14						0.0	939.6	3.82	14.53		0.00		0.00		0.00	0.00	0.14	4.21	1.18	0.00	15.71	43.54	37.30	250	0.97	1.206	27.83	63.92%
chemin Wanaki Road	PARK2	BLK147AE	MH147A	0.55						0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.55	0.55	0.15	0.00	0.15	39.24	17.70	250	0.40	0.774	39.08	99.61%
chemin Wanaki Road	147C	BLK147AW	MH147A	0.10						33.6	33.6	4.00	0.54		0.00		0.00		0.00	0.00	0.10	0.10	0.03	0.00	0.57	41.62	17.70	250	0.45	0.821	41.04	98.62%
chemin Wanaki Road	147A	MH147A	MH170A	0.03						0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.03	4.89	1.37	0.00	16.38	38.74	10.30	250	0.39	0.765	22.36	57.72%
chemin Wanaki Road	147B	MH170A	MH147C	0.16						0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.16	5.05	1.41	0.00	16.42	31.63	38.20	250	0.26	0.624	15.21	48.08%
chemin Wanaki Road		MH147C	BLK148AW							0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.00	5.05	1.41	0.00	16.42	46.01	11.80	250	0.55	0.908	29.58	64.30%
Phase 1A																																
chemin Wanaki Road		*BULK148AW*	*MH157A*							0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.00	5.05	1.41	0.00	16.42	62.04	8.00	250	1.00	1.224	45.61	73.52%
chemin Wanaki Road	157A	*MH157A*	*MH158A*	0.05						0.0	973.2	3.81	15.01		0.00		3.83		0.00	3.32	0.05	9.91	2.77	0.00	21.11	31.02	25.68	250	0.25	0.612	9.91	31.94%
Street No. 2	INST1	*BULK158AN*	*MH158A*							0.0	0.0	4.00	0.00	2.62	2.62		0.00		0.00	2.27	2.62	2.62	0.73	0.00	3.01	39.24	15.10	250	0.40	0.774	36.23	92.33%
chemin Wanaki Road	158A	*MH158A*	*MH154A*	0.22						0.0	973.2	3.81	15.01		2.62		3.83		0.00	5.60	0.22	12.75	3.57	0.00	24.18	31.02	68.91	250	0.25	0.612	6.84	22.05%

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LEGEND
Block 11&12 Proposed Conditions
Old Criteria being used

AS-BUILT SANITARY SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Canada Lands Company

LOCATION				RESIDENTIAL										ICI AREAS							INFILTRATION ALLOWANCE			FIXED	TOTAL	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		PEAK	PEAK	AREA (Ha)						PEAK	AREA (Ha)		FLOW	FLOW	FLOW	CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
														INSTITUTIONAL		COMMERCIAL		INDUSTRIAL														
STREET	AREA ID	FROM MH	TO MH	Phase 1B (Ha)	SF	SD	TH	APT	EXTERNAL (Ha)	IND	CUM	FACTOR	FLOW (L/s)	IND	CUM	IND	CUM	IND	CUM	FLOW (L/s)	IND	CUM	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
Phase 1B																																
Block 9	154A	Ex. BULK	MH217Aa	0.19						0.0	973.2	3.81	15.01		2.62		3.83		0.00	5.60	0.19	12.94	3.62	0.00	24.23	104.37	24.40	250	2.83	2.060	80.13	76.78%
Block 9		MH217Aa	MH217A							0.0	973.2	3.81	15.01		2.62		3.83		0.00	5.60	0.00	12.94	3.62	0.00	24.23	62.66	78.50	250	1.02	1.237	38.42	61.32%
croissant Squadron Crescent	215Aa-b	MH215A	MH216A	0.79	3	4				117.8	117.8	4.00	1.91		0.00		0.00		0.00	0.00	0.79	0.79	0.22	0.00	2.13	55.49	56.10	250	0.80	1.095	53.36	96.16%
croissant Squadron Crescent	216Aa-b	MH216A	MH217A	0.67	2	6				94.5	212.3	4.00	3.44		0.00		0.00		0.00	0.00	0.67	1.46	0.41	0.00	3.85	46.01	70.80	250	0.55	0.908	42.16	91.63%
croissant Squadron Crescent	217A	MH217A	MH218A	0.02						0.0	1185.5	3.75	18.01		2.62		3.83		0.00	5.60	0.02	14.42	4.04	0.00	27.65	39.72	9.70	250	0.41	0.784	12.07	30.39%
croissant Squadron Crescent	218A	MH218A	MH218B	0.02						0.0	1185.5	3.75	18.01		2.62		3.83		0.00	5.60	0.02	14.44	4.04	0.00	27.66	39.24	9.90	250	0.40	0.774	11.58	29.51%
Thorncliffe Village	THORN1	MH600A	MH601A						5.55	1574.0	1574.0	3.66	23.36		0.00		0.00		0.00	0.00	5.55	19.99	5.60	0.00	28.96	69.16	21.40	300	0.47	0.948	40.20	58.12%
Thorncliffe Village		MH601A	MH218B							0.0	1574.0	3.66	23.36		0.00		0.00		0.00	0.00	0.00	19.99	5.60	0.00	28.96	108.18	46.90	300	1.15	1.483	79.22	73.23%
croissant Squadron Crescent	218B	MH218B	MH219A	0.07						0.0	2759.5	3.47	38.82		2.62		3.83		0.00	5.60	0.07	34.50	9.66	0.00	54.08	96.76	40.20	300	0.92	1.326	42.68	44.11%
croissant Squadron Crescent	219A	MH219A	MH220A	0.15						0.0	2759.5	3.47	38.82		2.62		3.83		0.00	5.60	0.15	34.65	9.70	0.00	54.12	66.92	72.40	300	0.44	0.917	12.79	19.12%
croissant Squadron Crescent	220A, 220B	MH220A	MH221A	1.46						319.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	1.46	36.11	10.11	0.00	58.52	74.82	43.30	300	0.55	1.025	16.30	21.78%
croissant Squadron Crescent	221A	MH221A	MH222A	0.02						0.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	0.02	36.13	10.12	0.00	58.53	64.60	7.40	300	0.41	0.885	6.07	9.40%
croissant Squadron Crescent		MH222A	MH223A							0.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	0.00	36.13	10.12	0.00	58.53	58.82	81.60	300	0.34	0.806	0.30	0.51%
croissant Squadron Crescent	BLOCK 15	BLK223AE	MH223A	Design by Others																						109.23	10.00	250	3.10	2.156	109.23	100.00%
croissant Squadron Crescent	222A	MH223A	MH165A	0.22						0.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	0.22	36.35	10.18	0.00	58.59	96.24	36.10	300	0.91	1.319	37.65	39.12%

Design Parameters:

Residential			ICI Areas			Peak Factor
SF	3.4	p/p/u	INST	50,000	L/Ha/day	1.5
TH/SD	2.7	p/p/u	COM	50,000	L/Ha/day	1.5
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day 300 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+P^0.5))
where P = population in thousands

Designed: WY

Checked: JIM

Dwg. Reference: 38298-501

No.	Revision	Date
1.	City submission No. 1	2016-07-08
2.	City submission No. 2	2016-11-04
3.	City submission No. 3	2017-01-25
4.	Revised as per Mattamy's Design	2017-12-08
5.	As-Built Submission	2018-01-29
6.	Block 11 & 12 Study	2022-03-15

File Reference: 38298.5.7.1 | **Date:** 2016-07-08 | **Sheet No:** 1 of 2

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LEGEND
MH231A Existing infrastructure (shown for information only)
Block 11, 12 Existing Conditions (yellow highlight)

SANITARY SEWER DESIGN SHEET

Wateridge at Rockcliffe - Phase 2B
City of Ottawa
Canada Lands Company

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
STREET	AREA ID	FROM MH	TO MH	AREA w/ Units (Ha)	UNIT TYPES SF	SD / TH/F	TH/S	APT	AREA w/o Units (Ha)	POPULATION IND	POPULATION CUM	RES PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha) INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	ICI PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha) IND	AREA (Ha) CUM	FLOW (L/s)	IND	CUM	(L/s)	CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY L/s	AVAILABLE CAPACITY (%)
Pimiwidon Street	MH317-1, MH317-2	MH317A	MH316A	1.50	1	104				284.2	284.2	3.47	3.20	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.50	1.50	0.50	0.00	0.00	3.69	40.68	*83.00*	*250*	*0.43*	0.803	36.99	90.93%
Pimiwidon Street	MH316A	MH316A	BULK202AN	0.16		1				2.7	286.9	3.47	3.23	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.16	1.66	0.55	0.00	0.00	3.77	37.74	*43.10*	*250*	*0.37*	0.745	33.96	90.00%
Pimiwidon Street	-	*BULK202AN*	*MH202A*							*0.0*	*286.9*	*3.47*	*3.23*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*1.66*	*0.55*	*0.00*	*0.00*	*3.77*	*40.68*	*21.00*	*250*	*0.43*	*0.803*	*36.91*	*90.72%*
Wigwas Street	MH315A	MH315A	MH314A	0.79	2	18				55.4	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.79	0.79	0.26	0.00	0.00	0.92	49.63	*111.64*	*250*	*0.64*	0.979	48.72	98.16%
Wigwas Street	MH314A	MH314A	BULK203AN	0.06						0.0	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.06	0.85	0.28	0.00	0.00	0.93	83.46	*14.37*	*250*	*1.81*	1.647	82.53	98.88%
Wigwas Street	-	*BULK203AN*	*MH203A*							*0.0*	*55.4*	*3.64*	*0.65*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.85*	*0.28*	*0.00*	*0.00*	*0.93*	*80.17*	*21.00*	*250*	*1.67*	*1.582*	*79.24*	*98.83%*
Moses Tennisco Street	MH313A	MH313A	MH312A	0.66	2	16				50.0	50.0	3.65	0.59	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.66	0.66	0.22	0.00	0.00	0.81	75.73	*77.20*	*250*	*1.49*	1.495	74.92	98.93%
Moses Tennisco Street	MH312A, PARK	MH312A	BULK204AN	0.21		2				5.4	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.87	0.29	0.00	0.00	0.94	94.29	*49.70*	*250*	*2.31*	1.861	93.35	99.00%
Park	PARK	MH350A	pipe	0.42						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.42	0.42	0.14	0.00	0.00	0.14	48.39	*11.00*	*200*	*2.00*	1.492	48.25	99.71%
Moses Tennisco Street	-	*BULK204AN*	*MH204A*							*0.0*	*55.4*	*3.64*	*0.65*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.87*	*0.29*	*0.00*	*0.00*	*0.94*	*89.90*	*21.00*	*250*	*2.10*	*1.774*	*88.96*	*98.95%*
Michael Stoqua Street	MH311A	MH311A	MH310A	0.44	1	9				27.7	27.7	3.69	0.33	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.44	0.44	0.15	0.00	0.00	0.48	72.35	77.82	250	1.36	1.428	71.87	99.34%
Michael Stoqua Street	MH310A	MH310A	BULK205AN	0.21		2				5.4	33.1	3.68	0.39	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.65	0.21	0.00	0.00	0.61	65.66	49.19	250	1.12	1.296	65.05	99.07%
Michael Stoqua Street	-	*BULK205AN*	*MH205A*							*0.0*	*33.1*	*3.68*	*0.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.65*	*0.21*	*0.00*	*0.00*	*0.61*	*66.24*	*21.00*	*250*	*1.14*	*1.307*	*65.63*	*99.08%*
Wanaki Road	MH200A	MH200A	MH318A							0.0	0.0	3.80	0.00	0.00	0.00	1.01	1.01	0.00	0.00	1.50	0.49	1.01	1.01	0.33	0.00	0.00	0.82	42.53	*63.35*	*250*	*0.47*	0.839	41.71	98.06%
Wanaki Road	MH318A	MH318A	MH300A							0.0	0.0	3.80	0.00	0.00	0.00	0.95	1.96	0.00	0.00	1.50	0.95	0.95	1.96	0.65	0.00	0.00	1.60	42.53	*77.11*	*250*	*0.47*	0.839	40.93	96.24%
Tawadina Road	MH300A	MH300A	MH301A	0.47		15				40.5	40.5	3.67	0.48	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.47	2.43	0.80	0.00	0.00	2.24	*31.02*	*109.85*	*250*	*0.25*	0.612	28.78	92.79%
Tawadina Road	MH301A	MH301A	MH302A	0.54		14				37.8	78.3	3.62	0.92	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.54	2.97	0.98	0.00	0.00	2.85	*59.18*	*110.39*	*250*	*0.91*	1.168	56.33	95.18%
Tawadina Road	MH302A	MH302A	MH303A	0.26		2				5.4	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.26	3.23	1.07	0.00	0.00	3.00	*72.61*	*111.69*	*250*	*1.37*	1.433	69.62	95.87%
Tawadina Road	MH303A	MH303A	MH304A	0.21						0.0	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.21	3.44	1.14	0.00	0.00	3.07	31.02	112.10	250	0.25	0.612	27.95	90.11%
Tawadina Road	MH305A	MH305A	MH304A	0.24						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.24	0.24	0.08	0.00	0.00	0.08	49.63	111.61	250	0.64	0.979	49.55	99.84%
																					0.00													
Bareille-Snow Street	EXT-1	BULK304AN	MH304A	7.35				905		1629.0	1629.0	3.12	16.49	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	7.35	7.35	2.43	0.00	0.00	18.91	31.02	20.00	250	0.25	0.612	12.11	39.04%
Bareille-Snow Street	MH304A-1, MH304A-2	MH304A	MH308A	1.47				190		342.0	2054.7	3.06	20.38	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	1.47	12.50	4.13	0.00	0.00	25.14	39.72	119.21	250	0.41	0.784	14.58	36.70%
Bareille-Snow Street	MH308A	MH308A	BULK206AN	0.07						0.0	2054.7	3.06	20.38	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.07	12.57	4.15	0.00	0.00	25.17	84.15	16.82	250	1.84	1.661	58.99	70.09%
Bareille-Snow Street		BULK206AN	MH206A							0.0	2054.7	3.06	20.38	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.00	12.57	4.15	0.00	0.00	25.17	88.83	21.00	250	2.05	1.753	63.66	71.67%
Codd's Road	MH340A	MH340A	BLK231AN	1.78				278		500.4	500.4	3.38	5.48	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.78	1.78	0.59	0.00	0.00	6.07	75.98	70.00	250	1.50	1.500	69.91	92.01%
Codd's Road		*MH231A*	*BULK176AN*							*0.0*	*500.4*	*3.38*	*5.48*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*1.78*	*0.59*	*0.00*	*0.00*	*6.07*	*83.92*	*50.22*	*250*	*1.83*	*1.656*	*77.86*	*92.77%*

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u				
TH/F/SD	2.7	p/p/u	INST	28,000	L/Ha/day	
TH/S	2.3	p/p/u	COM	28,000	L/Ha/day	
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,
1.5 if greater than 20%, otherwise 1.0

Designed: KH

Checked: JIM

Dwg. Reference: 118863-400

No.	Revision	Date
1	Submission No. 1 for City Review	2018-12-20
2	Submission No. 2 for City Review	2019-03-15
3	MECP Submission	2019-04-17
4	Record information Added (No.1)	2020-10-08
5	Record information Added (No.2)	2021-03-23
6	Block 11 & 12 Study	2022-03-15

File Reference:	Date:	Sheet No:
118863.5.7.1	2021-03-31	1 of 1

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

LEGEND
MH231A Existing infrastructure (shown for information only)
Block 11&12 Proposed Conditions

SANITARY SEWER DESIGN SHEET

Wateridge at Rockcliffe - Phase 2B
City of Ottawa
Canada Lands Company

LOCATION: STREET	AREA ID	FROM MH	TO MH	RESIDENTIAL: AREA w/ Units (Ha)	UNIT TYPES: SF	SD / TH/F	TH/S	APT	AREA w/o Units (Ha)	POPULATION: IND	CUM	RES PEAK FACTOR	PEAK FLOW (L/s)	ICI AREAS: AREA (Ha) INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	ICI PEAK FACTOR	PEAK FLOW (L/s)	INFILTRATION ALLOWANCE: AREA (Ha) IND	CUM	FLOW (L/s)	FIXED FLOW (L/s): IND	CUM	TOTAL FLOW (L/s)	PROPOSED SEWER DESIGN: CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY L/s	(%)
Pimiwidon Street	MH317-1, MH317-2	MH317A	MH316A	1.50	1	104				284.2	284.2	3.47	3.20	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.50	1.50	0.50	0.00	0.00	3.69	40.68	*83.00*	*250*	*0.43*	0.803	36.99	90.93%
Pimiwidon Street	MH316A	MH316A	BULK202AN	0.16		1				2.7	286.9	3.47	3.23	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.16	1.66	0.55	0.00	0.00	3.77	37.74	*43.10*	*250*	*0.37*	0.745	33.96	90.00%
Pimiwidon Street	-	*BULK202AN*	*MH202A*							*0.0*	*286.9*	*3.47*	*3.23*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*1.66*	*0.55*	*0.00*	*0.00*	*3.77*	*40.68*	*21.00*	*250*	*0.43*	*0.803*	*36.91*	*90.72%*
Wigwas Street	MH315A	MH315A	MH314A	0.79	2	18				55.4	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.79	0.79	0.26	0.00	0.00	0.92	49.63	*111.64*	*250*	*0.64*	0.979	48.72	98.16%
Wigwas Street	MH314A	MH314A	BULK203AN	0.06						0.0	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.06	0.85	0.28	0.00	0.00	0.93	83.46	*14.37*	*250*	*1.81*	1.647	82.53	98.88%
Wigwas Street	-	*BULK203AN*	*MH203A*							*0.0*	*55.4*	*3.64*	*0.65*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.85*	*0.28*	*0.00*	*0.00*	*0.93*	*80.17*	*21.00*	*250*	*1.67*	*1.582*	*79.24*	*98.83%*
Moses Tennisco Street	MH313A	MH313A	MH312A	0.66	2	16				50.0	50.0	3.65	0.59	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.66	0.66	0.22	0.00	0.00	0.81	75.73	*77.20*	*250*	*1.49*	1.495	74.92	98.93%
Moses Tennisco Street	MH312A, PARK	MH312A	BULK204AN	0.21		2				5.4	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.87	0.29	0.00	0.00	0.94	94.29	*49.70*	*250*	*2.31*	1.861	93.35	99.00%
Park	PARK	MH350A	pipe	0.42						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.42	0.42	0.14	0.00	0.00	0.14	48.39	*11.00*	*200*	*2.00*	1.492	48.25	99.71%
Moses Tennisco Street	-	*BULK204AN*	*MH204A*							*0.0*	*55.4*	*3.64*	*0.65*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.87*	*0.29*	*0.00*	*0.00*	*0.94*	*89.90*	*21.00*	*250*	*2.10*	*1.774*	*88.96*	*98.95%*
Michael Stoqua Street	MH311A	MH311A	MH310A	0.44	1	9				27.7	27.7	3.69	0.33	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.44	0.44	0.15	0.00	0.00	0.48	72.35	77.82	250	1.36	1.428	71.87	99.34%
Michael Stoqua Street	MH310A	MH310A	BULK205AN	0.21		2				5.4	33.1	3.68	0.39	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.65	0.21	0.00	0.00	0.61	65.66	49.19	250	1.12	1.296	65.05	99.07%
Michael Stoqua Street	-	*BULK205AN*	*MH205A*							*0.0*	*33.1*	*3.68*	*0.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.65*	*0.21*	*0.00*	*0.00*	*0.61*	*66.24*	*21.00*	*250*	*1.14*	*1.307*	*65.63*	*99.08%*
Wanaki Road	MH200A	MH200A	MH318A							0.0	0.0	3.80	0.00	0.00	0.00	1.01	1.01	0.00	0.00	1.50	0.49	1.01	1.01	0.33	0.00	0.00	0.82	42.53	*63.35*	*250*	*0.47*	0.839	41.71	98.06%
Tawadina Road	MH300A	MH300A	MH301A	0.47		15				40.5	40.5	3.67	0.48	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.47	2.43	0.80	0.00	0.00	2.24	*31.02*	*109.85*	*250*	*0.25*	0.612	28.78	92.79%
Tawadina Road	MH301A	MH301A	MH302A	0.54		14				37.8	78.3	3.62	0.92	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.54	2.97	0.98	0.00	0.00	2.85	*59.18*	*110.39*	*250*	*0.91*	1.168	56.33	95.18%
Tawadina Road	MH302A	MH302A	MH303A	0.26		2				5.4	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.26	3.23	1.07	0.00	0.00	3.00	*72.61*	*111.69*	*250*	*1.37*	1.433	69.62	95.87%
Tawadina Road	MH303A	MH303A	MH304A	0.21						0.0	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.21	3.44	1.14	0.00	0.00	3.07	31.02	112.10	250	0.25	0.612	27.95	90.11%
Tawadina Road	MH305A	MH305A	MH304A	0.24						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.24	0.24	0.08	0.00	0.00	0.08	49.63	111.61	250	0.64	0.979	49.55	99.84%
																					0.00													
Bareille-Snow Street	EXT-1	BULK304AN	MH304A	7.35				905		1629.0	1629.0	3.12	16.49	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	7.35	7.35	2.43	0.00	0.00	18.91	31.02	20.00	250	0.25	0.612	12.11	39.04%
Bareille-Snow Street	MH304A-1, MH304A-2	MH304A	MH308A	1.48				140		252.0	1964.7	3.07	19.57	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	1.48	12.51	4.13	0.00	0.00	24.33	39.72	119.21	250	0.41	0.784	15.39	38.75%
Bareille-Snow Street	MH308A	MH308A	BULK206AN	0.96				352		633.6	2598.3	3.00	25.23	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.96	13.47	4.45	0.00	0.00	30.31	84.15	16.82	250	1.84	1.661	53.85	63.99%
Bareille-Snow Street		BULK206AN	MH206A							0.0	2598.3	3.00	25.23	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.00	13.47	4.45	0.00	0.00	30.31	88.83	21.00	250	2.05	1.753	58.52	65.88%
Codd's Road	MH340A	MH340A	BLK231AN	0.88				212		381.6	381.6	3.43	4.24	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.88	0.88	0.29	0.00	0.00	4.53	75.98	70.00	250	1.50	1.500	71.46	94.04%
Codd's Road		*MH231A*	*BULK176AN*							*0.0*	*381.6*	*3.43*	*4.24*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.88*	*0.29*	*0.00*	*0.00*	*4.53*	*83.92*	*50.22*	*250*	*1.83*	*1.656*	*79.40*	*94.61%*

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u	INST	28,000	L/Ha/day	
TH/F/SD	2.7	p/p/u	COM	28,000	L/Ha/day	
TH/S	2.3	p/p/u	IND	35,000	L/Ha/day	MOE Chart
APT	1.8	p/p/u				
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,
   1.5 if greater than 20%, otherwise 1.0

Designed: KH
Checked: JIM
Dwg. Reference: 118863-400

No.	Revision	Date
1	Submission No. 1 for City Review	2018-12-20
2	Submission No. 2 for City Review	2019-03-15
3	MECP Submission	2019-04-17
4	Record information Added (No.1)	2020-10-08
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6	Block 11 & 12 Study	2022-03-15

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Sheet No: 1 of 1

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Technical Memorandum

To/Attention	Mary Jarvis - Canada Lands Company	**Date**	November 23, 2022
From	Jim Moffatt – IBI Group	**Project No**	118863-2.0
cc	Krisendat Sewgoolam - Canada Lands Company Meghan Black - IBI Group Anton Chetrar - IBI Group		
Subject	Block 11 - Parcel 1 Site Plan Submission Wateridge Village Phase 2B		

Introduction

This technical memorandum has been prepared for Canada Lands Company and includes a review of the proposed site plan for Parcel 1 at Block 11 in Phase 2B of the Wateridge Village community. The review is based on the Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing prepared by IBI Group dated April 26, 2022, also included in **Appendix A**.

Figure 1, in the Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing, shows the location site plan for Parcel 1 at Block 11 for which DesignWorks Engineering is seeking approvals. Parcel 1 in Block 11 is surrounded by Tawadina Street to the north, Bareille-Snow Street to the west, Parcel 2 to the south and Michael Stoqua Street to the east. The plan consists of two 9-storey residential buildings with one level of underground parking.

The DesignWorks Engineering site plan shows different storm and sanitary servicing outlets than the ones provided by the Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing dated April 26, 2022. This memorandum will outline the impacts on wastewater disposal and a review of the water supply and low impact development for the proposed development. In terms of management of stormwater, the proposed design was compared to the aforementioned April 2022 IBI memo.

Sanitary Servicing

As stated previously, our review will be based on the Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing prepared by IBI Group dated April 26, 2022.

In the Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing, Parcel 1 in Block 11 is proposed to outlet into the sanitary sewer system on Barreille-Snow Street, north of MH308A. On the site plan submitted by DesignWorks Engineering for parcel, the sanitary sewer is proposed to outlet on Tawadina Street, west of MH304A.

An analysis of the ability of the existing sanitary sewer system in Tawadina Street to accommodate the flows from Parcel 1 in Block 11 was also completed. This analysis is included on the updated sanitary sewer spreadsheet included in **Appendix B**. The updated spreadsheet was based not only on the current City of Ottawa wastewater criteria, which came into effect in 2018 but also on the proposed site plan as submitted by DesignWorks Engineering. The following **Table 1** provides a review of the impacts of this change and the ability of the sanitary sewers to accept and convey any changes in flows.

Mary Jarvis – November 23, 2022

Table 1: Sanitary Flow vs Sewer Capacity Analysis

Street Location	Original Plan			Final DesignWorks Plan			Sewer Design		
	Units	Total Popn	Flows(l/s)	Units	TotalPopn	Flows(l/s)	Size(mm)	Spare Capacity(l/s)	
								Flow	%
Tawadina									
MH303A – MH304A	**0**	**83.7**	**3.07**	**240**	**515.7**	**7.96**	**250**	**23.06**	**74.33**
Bareille-Snow									
MH304A – MH308A	**140**	**1964.7**	**24.33**	**0**	**2238.3**	**26.80**	**250**	**12.93**	**32.54**

The updated analysis includes the existing sewer system highlighted on the Phase 2B design sheet. It is noted that the proposed site plan has new population of 432.0 people. This shows an increase of 273.6 people from the results of the Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing. The new calculated wastewater flows in the Tawadina Road sewer from MH303A to MH304A from Parcel 1 is 7.96 l/s. This shows a wastewater flow increase of 4.89 l/s as a result of re-directing wastewater flow of Parcels 1 from Barreille-Snow Street to Tawadina Road. The spare capacity of that sewer is 23.06 l/s. The capacity of the sanitary sewer in Barreille-Snow Street was analyzed as well. The wastewater flow between MH304A and MH308A is 26.80 l/s. This shows an increase of 2.47 l/s in wastewater flow with an available capacity of 12.93 l/s. For reference, a highlighted copy of the Phase 2B sanitary sewer design sheet is included in **Appendix B**.

The impact of re-directing wastewater flows from Parcel 1 in Block 11 to the Tawadina Road sanitary sewer has been completed. Based on the analysis noted above, the existing wastewater system in Wateridge Village Phase 2B has sufficient available capacity to carry the re-directed flows from Parcel 1 in Block 11. It is therefore concluded that the existing sanitary sewers in Tawadina Road, Bareille-Snow Street adjacent to the subject property can accommodate the re-direction of flows from Parcel 1 in Block 11.

Stormwater Servicing

The stormwater servicing is not consistent with the servicing presented in the Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing prepared by IBI Group dated April 26, 2022. For example, the minor storm connection proposed by DesignWorks Engineering is to Tawadina Road to the north, while it was concluded in the IBI memo that the connection is to be to Bareille-Snow Street to the west. IBI cannot at this time comment on the implication of such a change. It should be noted that in addition to minor system connectivity, the April 2022 memo also outlined major system connectivity as well as minor and major system requirements.

Water Servicing

The objective of this evaluation is to review the water distribution of the submitted site plan by DesignWorks Engineering. A watermain model for the site plan area was included in the phase 2B Design Brief. For reference, the modeling results for Phase 2B are included in **Appendix C**.

The site plan shows a new 200mm diameter watermain connection at the existing 400mm watermain on Tawadina Road. This connection is expected to service both buildings on the site plan. The water design criteria used in calculating the water demands and system pressures for the site plan in Block 11 submitted by DesignWorks Engineering is based on the latest City of Ottawa Water Distribution Guidelines. It is also confirmed that the fire flow demand was calculated on the latest Fire Underwriters Survey (FUS) 2020.

The Wateridge Phase 2B figure shows four nodes around the subject site (I14, I16, I18 and I20). The basic day pressures range from 551.6 kPa to 555.0 kPa on Tawadina Road. The City of Ottawa criteria for pressure reduction during basic day demand is 552 kPa. Therefore, based on our analysis the building along Tawadina Road will not require pressure reducing valves on internal plumbing. The peak hour pressures range between 498.8 kPa and 508.1 kPa. The City criteria is that peak hour pressures must exceed 276 kPa so there is no issue with this criterial. The fire flows available during maximum day demand range between 462.6 l/s and 850.5 l/s which greatly exceeds the required fire flow rate of 320.17 l/s for the proposed buildings on the site plan.

The results of the average day demand for the site shows a demand of 1.4 L/s or 120,960 L/day. The City of Ottawa requires that a minimum 2 feeds be provided to a service area with a demand above 50,000 L/day, to avoid service disruptions. Therefore, an additional watermain connection to service the site is required.

Low Impact Development

A review of the proposed site plan, located at Wateridge Village Phase 2B – Block 11, low impact development (LID) requirements was completed and included in **Appendix D**.

Conclusion

In summary, a review of the proposed site plan for which DesignWorks Engineering is seeking approvals was completed. In terms of wastewater disposal impacts, although the proposed sanitary servicing outlet is not consistent the Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing, we can conclude that the existing sanitary sewer in Tawadina Road can accommodate the re-direction of flows from Parcel 1 in Block 11. Based on the analysis above of the water distribution, an additional watermain connection is required at the proposed site plan to meet City of Ottawa Design Guidelines.

In terms of management of stormwater, the stormwater servicing is not consistent with the servicing presented in the Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing prepared by IBI Group dated April 26, 2022. Therefore, IBI cannot at this time comment on the implication of such a change.

We trust our conclusions are satisfactory for your purposes. We are, of course, available to review and discuss the information contained within this document.

Regards,

IBI GROUP

Jim Moffatt, P. Eng.
Associate

APPENDIX A

- Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing

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Memorandum

To/Attention	John Bernier, City of Ottawa Shawn Wessel, City of Ottawa	**Date**	April 26, 2022
From	Meghan Black Jim Moffatt	**Project No**	118863-5.3.1.5
cc	Mary Jarvis, Canada Lands Company		
Subject	Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing		

1. Background

Blocks 11 and 12 are located within Phase 2B of the Wateridge development and are indicated in **Figure 1**. The municipal servicing of the two blocks was addressed in, "Design Brief, Wateridge Village at Rockcliffe Phase 2B," prepared by IBI Group in April 2019. Subsequent to the approval of the Phase 2B detailed design, Canada Lands Company has sub-divided the subject blocks into five parcels for development. The parcels, identified as Parcels 1-5, are being considered for purchase by various parties. IBI has been engaged to assess the impact of this change on adjacent existing storm and sanitary sewers. Enclosed **Figure 1** depicts Blocks 11 and 12 and the respective five parcels.

2. Stormwater Management

2.1 Objective

The objective of the evaluation is to assess the impact on the dual drainage system of discretizing Blocks 11 and 12 into Parcels 1-5 and the associated impacts to the storm servicing. The detailed design of Parcels 1-5 will be carried out by others.

2.2 Dual Drainage Design

Per the Phase 2B design brief, minor storm runoff from Block 11 (identified as drainage area B309) drains to Bareille-Snow Street, with major flow tipping to Bareille-Snow Street at Hemlock Road. Minor flow from Block 12 (identified as drainage area B340) drains to Codd's Road with major flow draining to Hemlock Road. The minor system restriction for the two development blocks corresponds to between the 5 and 100 year storm event, and no on-site storage was proposed. The storm drainage area plan (Drawing 750) from the Phase 2B submission is enclosed in **Appendix A** for reference. With the proposed adjustments to the storm servicing for the sub-divided or discretized parcels, minor system capture and on-site storage has been re-assessed.

2.3 Hydrological Analysis

Hydrological analysis of the dual drainage system of the subject site has been conducted using DDSWMM, consistent with the simulations completed for the Phase 2B design brief.

2.3.1 Storm and Design Parameters

The following storms and design parameters have been used in the evaluation. The main hydrological parameters are summarized in **Table 2.1**, with a comparison of what was included in the Phase 2B evaluation.

- **Design Storms:** The subject site has been evaluated with the following storms, consistent with the Phase 2B evaluation:

  - 5 and 100 year 3 hour Chicago storm events, and associated stress test; applied for the evaluation of the trunk storm sewers;
  - 100 year 24 hour SCS Type II storm event, applied for the evaluation of the trunk storm sewers;
  - July 1979, August 1988, August 1996 historical storms per the OSDG.

- **Area and Imperviousness:** Block 11 (identified as drainage area B309) and Block 12 (identified as drainage area B340) have been discretized into Parcels 1 through 5. An imperviousness value of 86% has been applied to the parcels, consistent with the values applied for B309 and B340 in the Phase 2B design brief.

- **Infiltration:** Infiltration losses were selected to be consistent with the OSDG. The Horton values are as follows: f_o = 76.2 mm/h, f_c = 13.2 mm/h, k = 0.00115 s^{-1}.

- **Subcatchment Width:** The catchment width for the parcels was based on 225 m/ha.

- **Slope:** The ground slope was based upon the average slope for both impervious and pervious area. Generally, the slope is approximately 2% (0.02 m/m). This assumes a slope of approximately 1% for impervious or road surfaces and 3% for pervious surfaces (lot grading).

- **Initial Abstraction (Detention Storage):** Detention storage depths of 1.5 mm and 4.67 mm were used for impervious and pervious areas, respectively. These values are consistent with the OSDG.

- **Manning's roughness:** Manning's roughness coefficients of 0.013 and 0.25 were used for impervious and pervious areas, respectively.

- **Baseflow:** No baseflow components were assumed for any of the areas contributing runoff to the minor system within the DDSWMM model.

- **Minor System Capture:** The minor system capture for the parcels ranges from the 5 year to the 100 year, with three parcels capturing between the 5 and 100 year simulated flow.

- **Major System Storage and Routing:** In order to continue to satisfy City design guidelines, on-site storage has been introduced on four of the parcels, as noted below.

A summary of parameters and minor system and on-site storage is presented in the following tables. A summary from the Phase 2B detailed design is included to facilitate review. Refer to

Figure 2 for the overall storm sewer network and to **Figure 3** for a depiction of the minor and major system connectivity for the five parcels.

Table 2.1 Hydrological Parameters

Block	Phase 2B Design Brief							Current Evaluation							
	Drainage Area ID	Area (ha)	Major System: D/S Segment ID	Minor System: MH ID	IMP Ratio	Segment Length (m)	Sub-catchment Width (m)	Parcel	Drainage Area ID	Area (ha)	Major System: D/S Segment ID	Minor System: MH ID	IMP Ratio	Segment Length (m)	Sub-catchment Width (m)
11	B309	1.24	S308A on Bareille-Snow	MH309 on Bareille-Snow	0.86	135.1	270.2	1	B309_1	0.72	S308 on Bareille-Snow	MH309 on Bareille-Snow	0.86	81	162
								2	B309_2	0.52	S308A on Bareille-Snow	MH310 on Michael Stoqua	0.86	58.5	117
12	B340	1.24	S207 on Hemlock	MH305 on Codd's Road	0.86	173.1	346.3	3	B340_3	0.34	S308A on Bareille-Snow	MH308 on Bareille-Snow	0.86	38.25	76.5
								4	B340_4	0.53	S308 on Bareille-Snow	MH309 on Bareille-Snow	0.86	59.63	119.25
								5	B340_5	0.37	S340 on Codd's	MH305 on Codd's Road	0.86	41.63	83.25

Table 2.2 Minor System Restriction and On-site Storage

Block	Phase 2B Design Brief				Current Evaluation					
	Drainage Area ID	Minor System Capture		Required On-Site Storage (cu-m)	Parcel	Drainage Area ID	Minor System Capture		Major System	
		Simulated Flow (l/s)	Corresponding Design Storm				Simulated Flow (l/s)	Corresponding Design Storm	Required On-Site Storage (cu-m)	Comment
11	B309	370	Between 5 and 100	None	1	B309_1	195	Between 5 and 100 year	43	Control up to the 100 year event
					2	B309_2	105	5 year	64	Control up to the 100 year event
12	B340	366	Between 5 and 100	None	3	B340_3	95	Between 5 and 100 year	18	Control up to the 100 year event
					4	B340_4	150	Between 5 and 100 year	21	Control up to the 100 year event
					5	B340_5	139	100 year	None	N/A

2.4 Results of Hydrological Modeling

2.4.1 Minor System

The minor system hydrographs generated by the hydrological model were exported to the hydraulic model for analysis, discussed in **Section 2.5**.

2.4.2 Major System

Due to the adjustment in major system connectivity, the major system has been reassessed. Refer to drainage areas on Drawing 750 from the Phase 2B submission in **Appendix A**.

2.4.2.1 Street Segment Storage

The available and utilized street sag storage is summarized in the below table for street segments in affected by the revised storm servicing of Parcels 1-5.

Table 2.3 Summary of On-site Street Storage (Available and Utilized) During Target Minor System Design Storm in Vicinity of Parcels 1-5

Street	Drainage Area ID	Minor System Design Storm	Available Static Storage (cu-m)	Total Storage Utilized During Minor System Design Storm (cu-m)	Overflow During Minor System Design Storm (l/s)
Michael Stocqua	S310A	5	61.39	0	0
Bareille-Snow	S308A	5	40.38	0	0
Hemlock	S176C	5	1.14	0	0

The results indicate that there is no ponding on the street segments during the minor system design storm.

2.4.2.2 Velocity x Depth

According to the City of Ottawa Sewer Design Guidelines (October 2012), the maximum depth of flow should not exceed 350 mm and the product of velocity and depth on all the street segments should not exceed 0.6 m^2/s during the 100 year storm event.

The cascading overflow is the flow exiting a drainage area when maximum minor system inflow and maximum available ponding has been utilized. To determine velocity of the cascading overflow, a SWMHYMO file was created (118863VD.dat).

To determine velocity of the cascading overflow at critical locations, SWMHYMO was used. The ROW sections were entered into the model with the appropriate longitudinal slopes to obtain the maximum velocity of flow using the Route Channel routine. The overflow is obtained from the respective DDSWMM output file and is noted in the footnotes of the below tables.

To determine depth of the cascading overflow, the *Calculation Sheet: Overflow From Typical Road Ponding Area* provided at the February 2014 Technical Bulletin ISDTB-2014-01 was used. The exception to this is where the road is on grade in which case the depths were obtained from the SWMHYMO model.

The results are presented in **Table 2.4** and **Table 2.5** and the supporting calculations are included in **Appendix A**.

Table 2.4 Summary of Cascading Flow during the 100 year 3 hour Chicago storm

Street	Drainage Area ID	Dummy Segment ID	Overflow (l/s)[1]	Velocity (m/s)[2]	Max. Static Ponding Depth (m)	Depth of Dynamic Flow (m)[3]	Max. Depth (Static + Dynamic) (m)	Velocity x Depth (m^2/s)
Michael Stoqua	S311A	N/A	49	0.73	N/A	0.04	0.04	0.03
Michael Stoqua	S310A	D14	0	0	0.29	0	0.29	0
Bareille-Snow	S309	N/A	43	0.50	N/A	0.05	0.05	0.03
Bareille-Snow	S308	N/A	65	0.84	N/A	0.05	0.05	0.04
Bareille-Snow	S308A	D18	26	0.47	0.26	0.05	0.31	0.03
Codd's	S340	N/A	50	0.88	N/A	0.04	0.04	0.04
Codd's	S231	N/A	100	0.62	N/A	0.07	0.07	0.04
Hemlock	S205C	N/A	37	0.48	N/A	0.05	0.05	0.02
Hemlock	S207	N/A	61	0.55	N/A	0.06	0.06	0.03

(1) Overflow from DDSWMM output 118863-3CHI100.out
(2) Velocity from SWMHYMO output 118863VD.out
(3) Depth of the cascading overflow was determined from the Calculation Sheet: Overflow From Typical Road Ponding Area provided in the February 2014 Technical Bulletin ISDTB-2014-01. For those areas which have a continuous road grade (or no dummy segment), the depth was taken from SWMHYMO VxD simulation.

Table 2.5 Summary of Cascading Flow during the 100 year 3 hour Chicago storm + 20%

Street	Drainage Area ID	Dummy Segment ID	Overflow (l/s)[1]	Velocity (m/s)[2]	Max. Static Ponding Depth (m)	Depth of Dynamic Flow (m)[3]	Max. Depth (Static + Dynamic) (m)	Velocity x Depth (m^2/s)
Michael Stoqua	S311A	N/A	66	0.79	N/A	0.05	0.05	0.04
Michael Stoqua	S310A	D14	33	0.61	0.29	0.06	0.35	0.04
Bareille-Snow	S309	N/A	71	0.57	N/A	0.06	0.06	0.03
Bareille-Snow	S308	N/A	216	1.15	N/A	0.08	0.08	0.09
Bareille-Snow	S308A	D18	268	1.29	0.26	0.13	**0.39**	0.17
Codd's	S340	N/A	98	1.04	N/A	0.05	0.05	0.06
Codd's	S231	N/A	165	0.71	N/A	0.08	0.08	0.06
Hemlock	S205C	N/A	46	0.51	N/A	0.05	0.05	0.03

Street	Drainage Area ID	Dummy Segment ID	Overflow (l/s)[1]	Velocity (m/s)[2]	Max. Static Ponding Depth (m)	Depth of Dynamic Flow (m)[3]	Max. Depth (Static + Dynamic) (m)	Velocity x Depth (m^2/s)
Hemlock	S207	N/A	89	0.60	N/A	0.07	0.07	0.04

(1) Overflow from DDSWMM output 118863-3CHI120.out
(2) Velocity from SWMHYMO output 118863VD.out
(3) Depth of the cascading overflow was determined from the Calculation Sheet: Overflow From Typical Road Ponding Area provided in the February 2014 Technical Bulletin ISDTB-2014-01. For those areas which have a continuous road grade (or no dummy segment), the depth was taken from SWMHYMO VxD simulation.

During the 100 year 3 hour Chicago storm, the summation of depth of ponding and depth of cascading flow for all street segments is less than the City guideline of 0.35 m. The product of depth and velocity is also less than the City guideline of 0.6 m^2/s.

During the sensitivity analysis applying the 100 year 3 hour Chicago storm increased by 20%, the summation of depth of ponding and depth of cascading flow for all street segments is less than the City guideline of 0.35 m, with the exception of S308A, noted in the above table in bold red type. At all locations, the product of depth and velocity is less than the City guideline of 0.6 m^2/s.

These results are consistent with those of the Phase 2B detailed design. It should be noted that major flow from the above-noted affected areas is at or below that accounted for in the Phase 2B model.

The area at which total depth of ponding and cascading flow exceeds 0.35 m during the stress test is noted in the below table with the critical adjacent property elevation.

Table 2.6 Critical Ponding Locations during the Stress Test and Adjacent Property Elevations

Drainage Area ID	Low Point Elevation (m)	Max. Depth (Static + Dynamic) (m)	(1) Corresponding Elevation (m)	(2) Adjacent Property Line (m)	Difference (2) – (1)
S308A	88.74	0.39	89.13	89.01	-0.12

The corresponding stress test ponding elevation is greater than the adjacent block grading at the boulevard. At the detailed design stage of the blocks, house openings must be greater than the ponding elevation.

2.5 Storm Hydraulic Grade Line Analysis

The hydraulic grade line (HGL) was evaluated using the XPSWMM hydraulic model. The existing overall model for the Wateridge site, most recently revised as part of the Phase 4 submission (December 2021), was revised to include the revised servicing of Parcels 1-5.

XPSWMM simulations were conducted for the 100 year 3 hour Chicago storm to ensure that the HGL is at least 0.3 m below the underside of footing elevations. A sensitivity analysis was also performed using the 100 year Chicago storm with a 20% increase in intensity to ensure that there is no severe flooding to properties. Hydraulic grade line elevations along the existing downstream Phase 1A trunk storm sewer and relevant Phase 2B storm sewers are presented in the below table for these storms, along with a comparison of underside of footing (USF) elevations. Results for the overall development area are presented in the enclosed **Appendix A**, including for the three historical storms per OSDG. Refer to **Figure 1** for the location of storm maintenance holes.

Table 2.7 Storm Hydraulic Grade Line – Phase 1A Trunk and Relevant Phase 2B Storm Sewers

MH ID	Street	Proposed Ground Elev. (m)	USF (m)	100 year 3 hour Chicago		100 year 3 hour Chicago + 20%	
				HGL (m)	USF – HGL (m)	HGL (m)	USF – HGL (m)
MH194	*Top of the escarpment*	82.05	N/A	80.47	N/A	80.55	N/A
MH193	OSHEDINAA	84.68	82.68	81.12	1.56	81.28	1.40
MH192	OSHEDINAA	84.99	82.99	81.46	1.53	81.64	1.35
MH191	OSHEDINAA	85.76	83.76	81.72	2.04	81.93	1.83
MH190	OSHEDINAA	86.36	84.36	81.96	2.40	82.19	2.17
MH180	OSHEDINAA	86.96	84.96	82.27	2.69	82.77	2.19
MH178	HEMLOCK	89.00	86.60	83.41	3.19	83.47	3.13
MH176	HEMLOCK	88.03	85.63	83.77	1.86	83.85	1.78
MH231	CODD'S	89.81	87.41	85.61	1.79	85.64	1.77
MH305	CODD'S	91.00	88.60	86.54	2.06	86.56	2.04
MH207	HEMLOCK	88.53	86.13	84.65	1.48	84.65	1.48
MH206	HEMLOCK	89.10	86.70	85.65	1.05	85.65	1.05
MH308	BAREILLE-SNOW	89.68	87.28	86.88	0.40	86.69	0.59
MH309	BAREILLE-SNOW	90.15	87.75	87.44	0.31	87.08	0.67
MH205	HEMLOCK	89.35	86.95	85.86	1.09	85.88	1.07
MH310	MICHAEL STOCQUA	90.04	87.64	87.28	0.36	87.42	0.22
MH311	MICHAEL STOCQUA	90.69	88.29	87.44	0.85	87.56	0.73

Along the Phase 1A trunk and Phase 2B storm sewers presented above, a minimum 0.3 m clearance between the USF and HGL is maintained during the 100 year 3 hour Chicago storm and the HGL elevations remain below USF elevations during the sensitivity analysis. This is also true for the results for the remainder of the development area for additional storm simulations (enclosed in **Appendix A**).

2.6 Conclusion

The storm servicing of Blocks 11 and 12 was addressed during the detailed design of Phase 2B. The purpose of this evaluation is to assess the impact on the dual drainage system of discretizing Blocks 11 and 12 into Parcels 1-5 and the associated revisions to the storm servicing. The proposed minor and major connectivity of the five parcels is presented on **Figure 3** and minor system capture and required on-site storage is summarized in **Table 2.2**.

In terms of major flow, the depth and velocity of flow on streets adjacent to the five parcels was evaluated. City guidelines with respect to ponding during the minor system design storm, as well as maximum depth and velocity of flow are maintained. Major flow from the adjacent street segments is at or below that accounted for in the Phase 2B model.

With respect to minor flow, the hydraulic grade line evaluation was updated with the revised inflow hydrographs from the five parcels. Results indicate that a minimum 0.3 m clearance between the USF and HGL is maintained during the 100 year 3 hour Chicago storm and the HGL elevations remain below USF elevations during the sensitivity analysis.

It is therefore concluded that the proposed storm servicing to support Parcels 1-5 can be accommodated by the existing storm infrastructure.

3. Wastewater Outlet

3.1 Objective

The objective of this evaluation is to assess the impact on the existing wastewater system by the sub-division of Blocks 11 and 12 into five parcels. **Figure 4** shows the location of the subject site and the existing sanitary sewers which will be impacted by this change.

3.2 Existing Conditions

Development of Phase 2B included the construction of sanitary sewers in Codd's Road from MH231A to the MH340A and Bareille-Snow Street from BLK308A to MH304A. The sanitary sewer on Codd's Road was designed to capture wastewater flows from Block 12 and the sanitary sewer on Bareille-Snow Street was designed to capture wastewater flows from Block 11. The Bareille-Snow sewer outlets to a sanitary sewer in Hemlock Road. The latter sewer was designed in 2017, using the City's wastewater flow criteria in effect at that time and predicted a flow of 28.49 l/s tributary from the Bareille-Snow sewer. The Bareille-Snow sanitary sewer was designed in 2019 based on flow calculation criteria in effect at that time and predicted a slightly less flow of 25.17 l/s. A highlighted copy of the Phase 2B sanitary sewer design sheet is included in **Appendix B**. The spreadsheet has been highlighted to indicate the immediate downstream sewers on Codd's Road and Bareille-Snow Street. The flow calculations in the Phase 2B spreadsheet were based on the City of Ottawa's wastewater criteria in effect of that time (2019) and the block population densities noted in the Master Servicing Study.

3.3 Proposed Condition

Because of the sub-division of Blocks 11 and 12 into five parcels, less wastewater flow is now proposed to outlet to the Codd's Road sanitary sewer. The Phase 2B sewer designed assumed all Block 12 would outlet to that sewer but now only parcel 5 is proposed to outlet in that direction. No further analysis is therefore needed for the Codd's Road sewer.

Parcels 3 and 4, which represent the balance of Block 12, are now proposed to outlet to the existing sanitary sewer in Bareille-Snow Street and not the Codd's Road sewer. There is no proposed change to the wastewater outlet for parcels 1 and 2. The Phase 2B design assumed all Block 11 would outlet to the Bareille-Snow sewer. Consequently, the expected wastewater flows to the latter pipe will likely increase.

An analysis of the ability of the existing sanitary sewer system in Bareille-Snow Street to accommodate the flows from both Block 11 and 12 was completed. This analysis is included on the updated sanitary sewer spreadsheet included in **Appendix B**. The updated spreadsheet was based not only on the current City of Ottawa wastewater criteria, which came into effect in 2018 but also on the most current concept plans for the various parcels which are also included in **Appendix B**. The updated analysis includes the existing sewer system highlighted on the Phase 2B design sheet.

Based on the updated analysis, the calculated wastewater flows tributary to the Hemlock Road sewer from Bareille-Snow Street is 30.31 l/s. This shows a wastewater flow increase of 1.82 l/s as a result of re-directing wastewater flows from parcels 3 and 4 in Block 12. The capacity of that sewer is 88.83 l/s. The Phase 1B design of the sanitary sewer in Hemlock Road between Bareille-Snow Street and Codd's Road indicated a spare capacity in that sewer of about 58 l/s. For reference, a highlighted copy of the Phase 1B sanitary sewer design sheet is included in **Appendix B**.

3.4 Conclusion

The impact of re-directing wastewater flows from Block 12 to the Bareille-Snow Street sanitary sewer has been completed. Based on the analysis noted above, the existing wastewater system in Wateridge Village Phase 1B and 2B has sufficient available capacity to carry the re-directed flows from Block 12. It is therefore concluded that the existing sanitary sewers in Bareille-Snow Street, Codd's Road and Hemlock Road adjacent to the subject property can accommodate the re-direction of flows from Block 12.

Project Title

STORM AND SANITARY SERVICING
ASSESSMENT OF BLOCK 11 AND 12
WATERIDGE VILLAGE PHASE 2B

Drawing Title

LOCATION PLAN

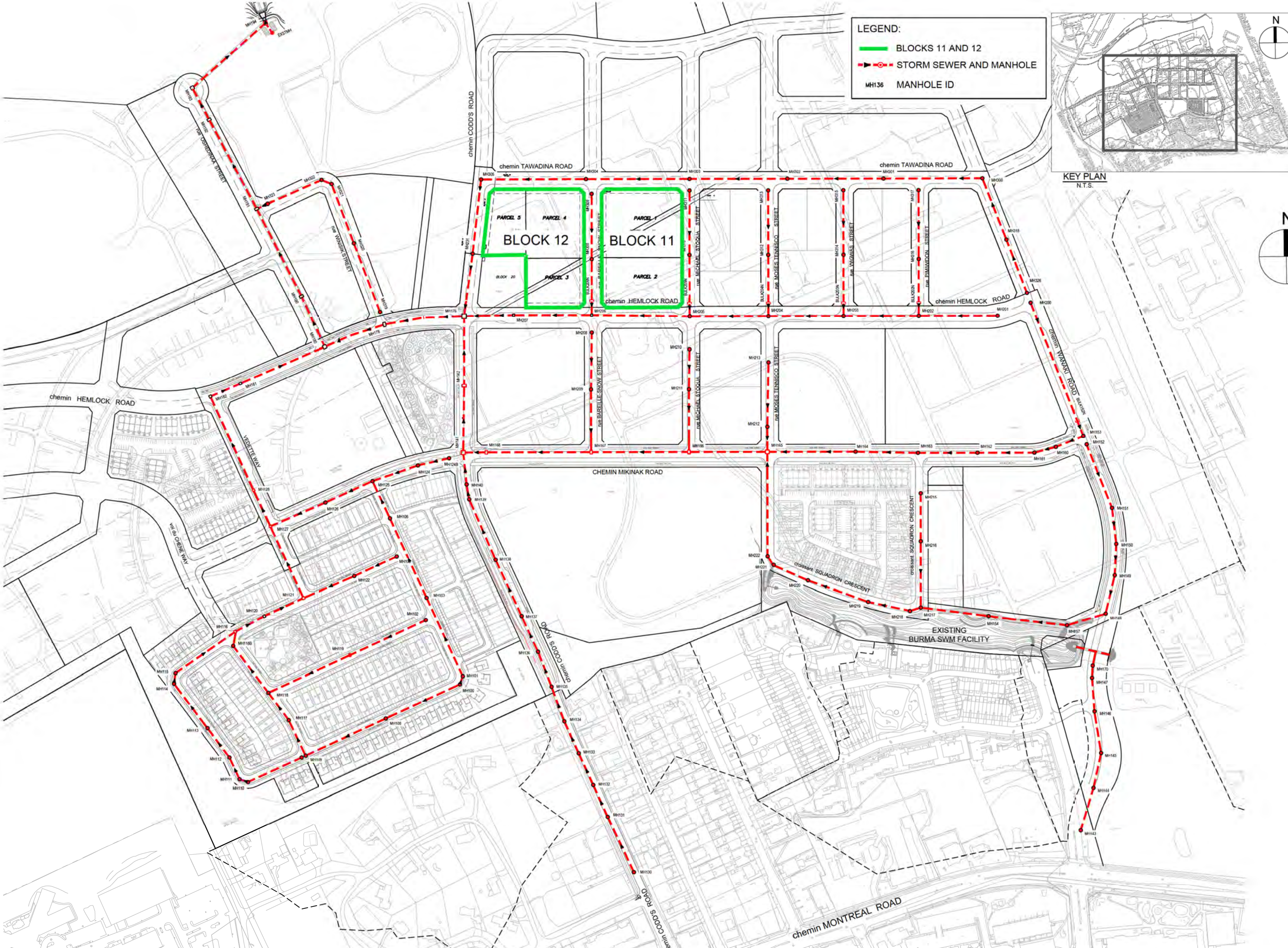
Scale

N.T.S.

Sheet No.

FIGURE 1

J:\38298–CFBRockcliffe\5.9 Drawings\59civil\SWM\FIGURES\BLOCK 11,12\FIGURE 1.dwg Layout Name: FIG1 Plot Style: AIA STANDARD COLOR–HALF.CTB Plotted At: 4/25/2022 5:40 PM Last Saved By: swaic, Apr. 25, 22



Scale

N.T.S.

Project Title

STORM AND SANITARY SERVICING
ASSESSMENT OF BLOCK 11 AND 12
WATERIDGE VILLAGE PHASE 2B

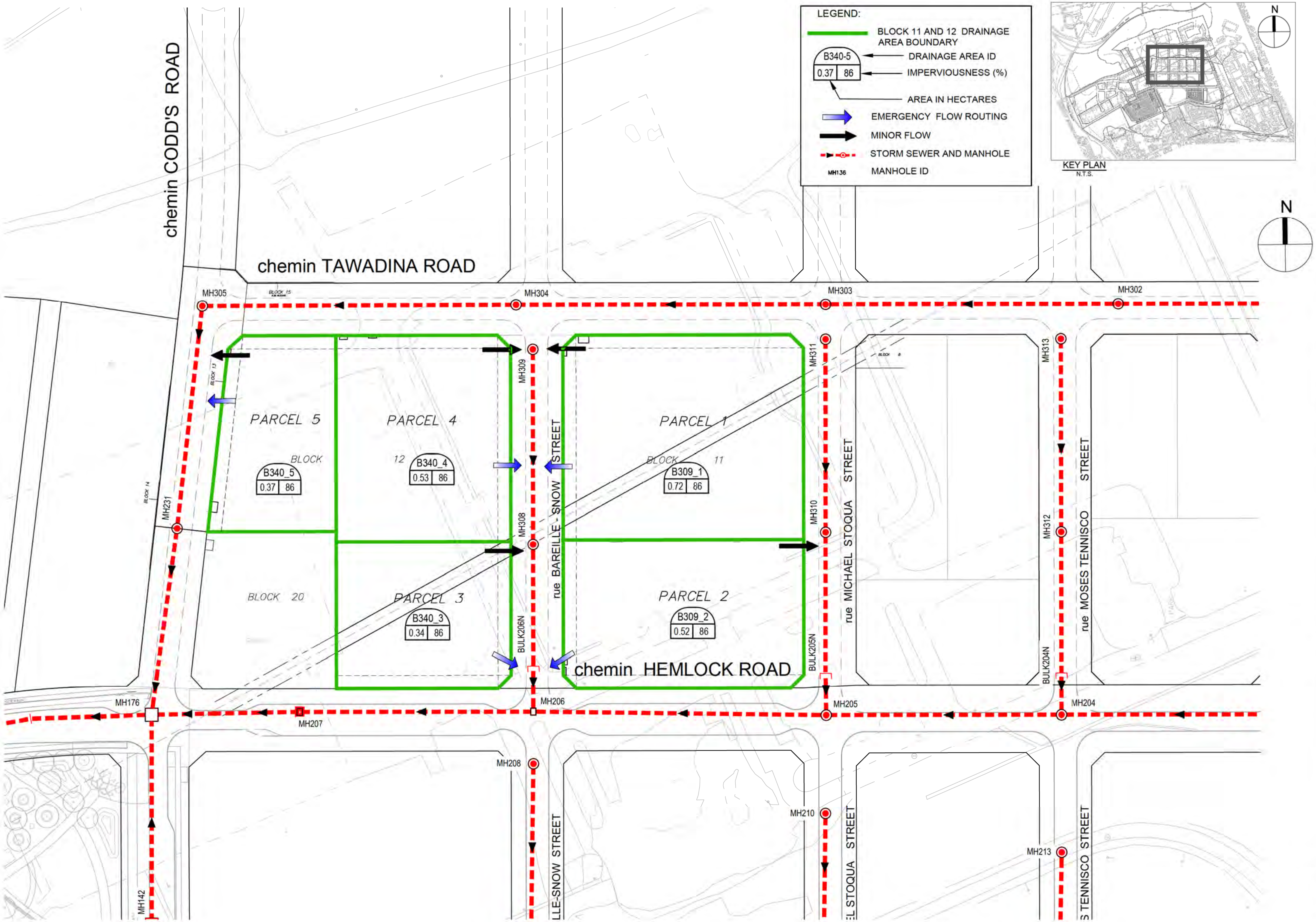
Drawing Title

LOCATION PLAN
AND STORM SEWER
NETWORK

Sheet No.

FIGURE 2

J:\38298–CFBRockcliffe\5.9 Drawings\59civil\SWM\FIGURES\BLOCK 11,12\FIGURE 2.dwg Layout Name: FIG2 Plot Style: AIA STANDARD COLOR–HALF.CTB Plotted At: 4/25/2022 5:45 PM Last Saved By: svukic, Apr. 25, 22

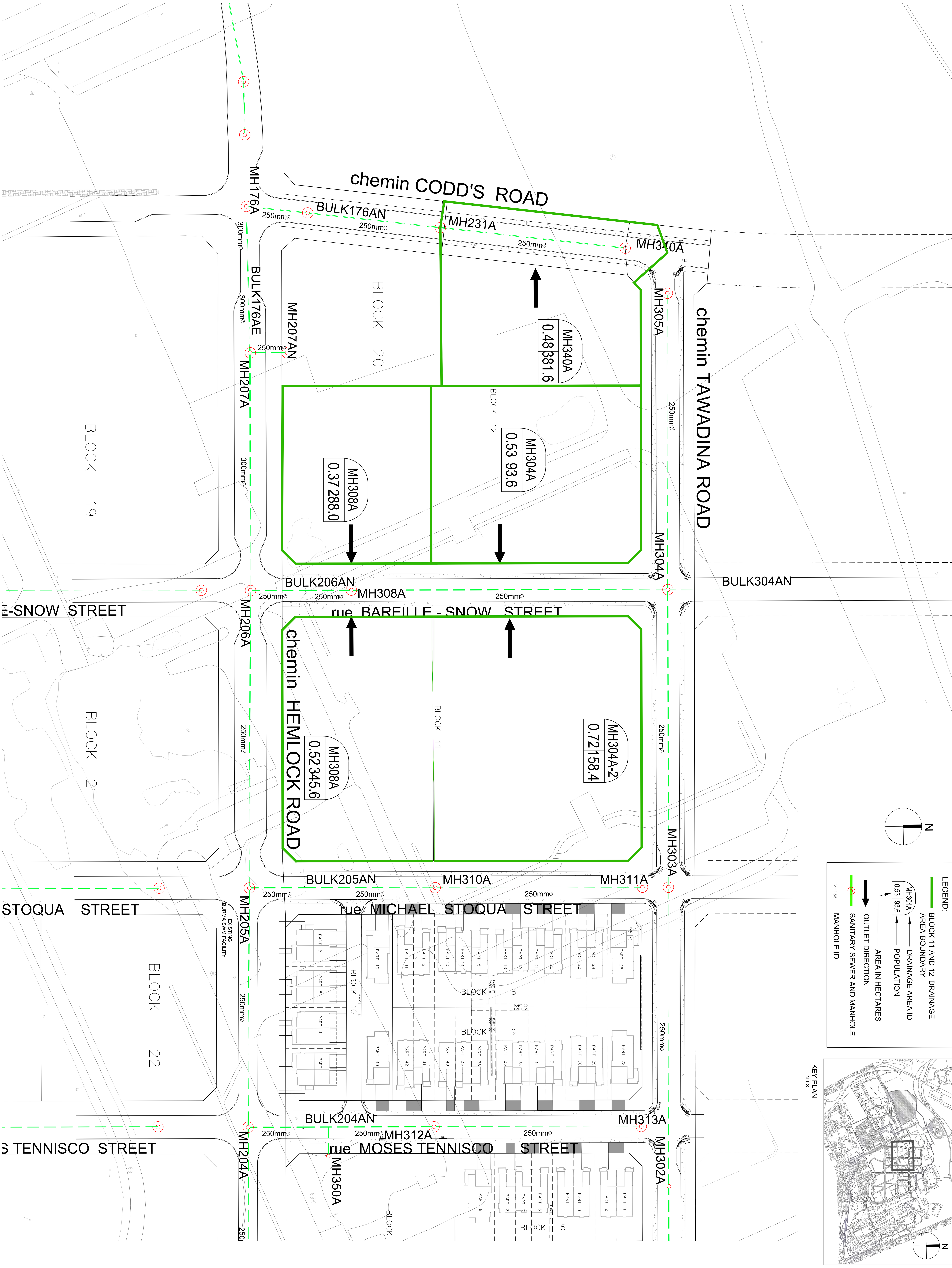


Scale: N.T.S.

Project Title: STORM AND SANITARY SERVICING ASSESSMENT OF BLOCK 11 AND 12 WATERIDGE VILLAGE PHASE 2B

Drawing Title: MINOR AND MAJOR SYSTEM CONNECTIVITY

Sheet No. FIGURE 3



Sheet No.	Drawing Title	Project Title	Scale
FIGURE 4	LOCATION PLAN AND SANITARY SEWER NETWORK	STORM AND SANITARY SERVICING ASSESSMENT OF BLOCK 11 AND 12 WATERIDGE VILLAGE PHASE 2B	N.T.S.

IBI

Appendix A

Supporting Storm Information

Summary of Model Files

DDSWMM:

5 year 3 hour Chicago: 118863-3CHI5.DAT
100 year 3 hour Chicago: 118863-3CHI100.DAT
100 year 3 hour Chicago + 20%: 118863-3CHI120.DAT

100 year 24 hour SCS Type II: 118863-24SCS100.DAT
100 year 24 hour SCS Type II + 20%: 118863-24SCS120.DAT

July 1979: 118863-JUL79.DAT
August 1988: 118863-AUG88.DAT
August 1996: 118863-Aug96.DAT

SWMHYMO VxD:

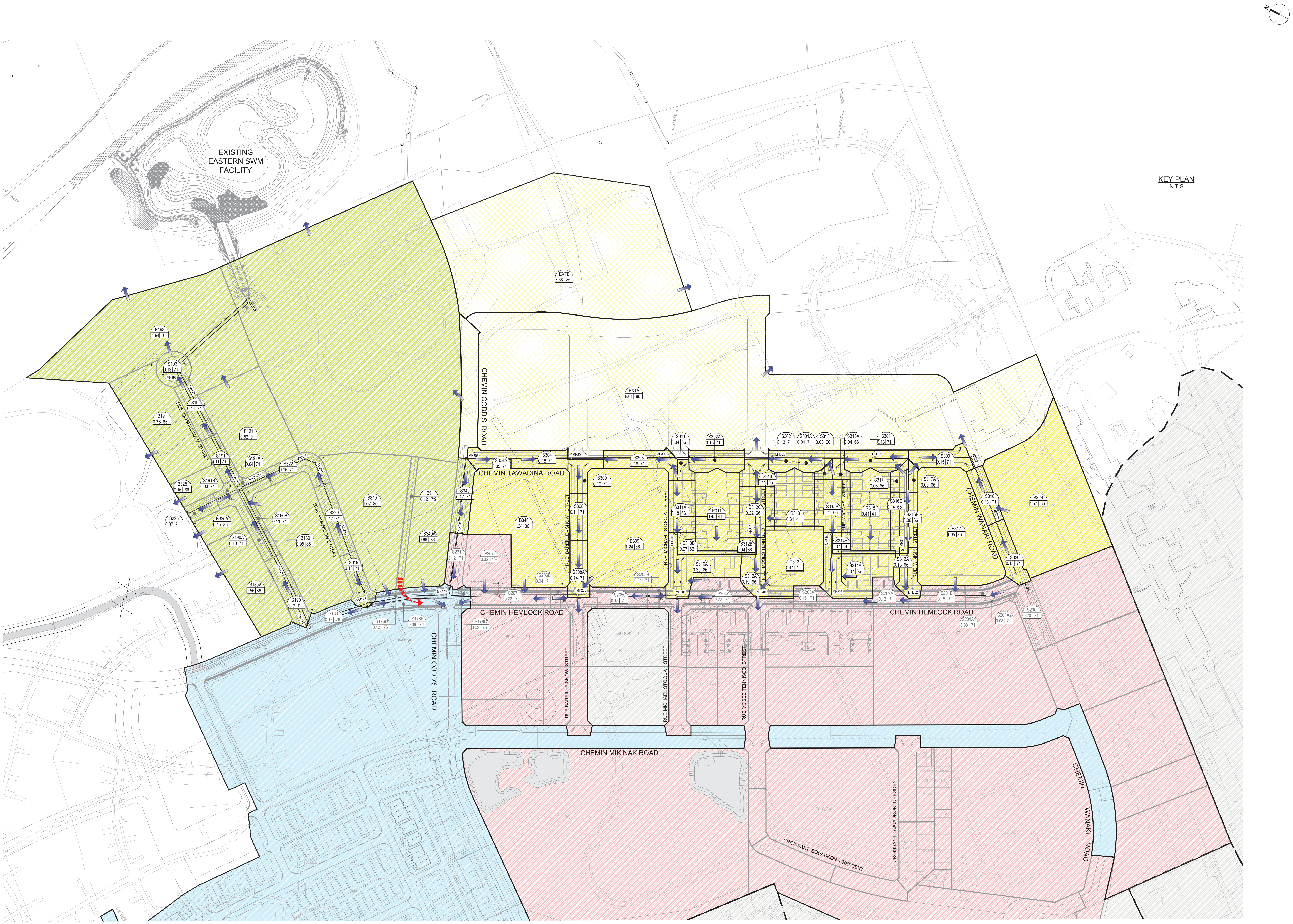
118863VD.dat

XPSWMM:

5 year 3 hour Chicago: 118863-3CHI5_BLK1112_V08_2022-03-15.XP
100 year 3 hour Chicago: 118863-3CHI100_BLK1112_V08_2022-02-28.XP
100 year 3 hour Chicago + 20%: 118863-3CHI120_BLK1112_V08_2022-02-28.XP

100 year 24 hour SCS Type II: 118863-24SCS100_BLK1112_V08_2022-03-15.XP
100 year 24 hour SCS Type II + 20%: 118863-24SCS120_BLK1112_V08_2022-03-15.XP

July 1979: 118863-JUL1979_BLK1112_V08_2022-03-15.XP
August 1988: 118863-AUG1988_BLK1112_V08_2022-03-15.XP
August 1996: 118863-AUG1996_BLK1112_V08_2022-03-15.XP



LEGEND:

- PHASE 2B DRAINAGE AREA
- PHASE 2A DRAINAGE AREA (FUTURE)
- PHASE 2C 2D DRAINAGE AREA (FUTURE)
- PHASE 1B DRAINAGE AREA (EXISTING)
- PHASE 1A DRAINAGE AREA (EXISTING)
- EXTERNAL DRAINAGE AREA

S318 — AREA ID
71 — Imp.(%)
0.13 — AREA (ha)

- MAJOR FLOW
- TOTAL FLOW
- MH136 MANHOLE ID

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2			
1	SUBMISSION No.1 FOR CITY REVIEW	P.S.	2018:12:20

CANADA LANDS COMPANY
SOCIÉTÉ IMMOBILIÈRE DU CANADA
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613 998 7777

IBI GROUP
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Ottawa ON K1S 5N4 Canada
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ibigroup.com

Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 2B

M.S.BLACK
100101736
2019/04/17

Drawing Title

DDSWMM MODEL SCHEMATIC

Scale 1:2000	
Design M.B	Date DEC. 2018
Drawn S.V.	Checked P.S.
Project No. 118863	Drawing No. 750

D07-16-15-0003

#17063

Velocity x Depth Calculation

Iteration equation:

Velocity:

$$v_x = v_{\min} + \frac{Q_x - Q_{\min}}{Q_{\max} - Q_{\min}} (v_{\max} - v_{\min})$$

Depth:

$$d_x = d_{\min} + \frac{Q_x - Q_{\min}}{Q_{\max} - Q_{\min}} (d_{\max} - d_{\min})$$

100 Year 3 Hour Chicago Storm																				
					SWMHYMO (118863VD.OUT)					Calculation Sheet: Overflow for Typical Road Ponding Area					SWMHYMO (118863VD.OUT)			Velocity x Depth	Maximum Static Ponding Depth	Total Depth (Static + Dynamic)
Area ID (Dummy Segment, if applicable)	Road ROW Section	Longitudinal Slope (%)	Overflow Flowrate		Flowrate (cms)		Velocity (m/s)			Flowrate (cms)		Depth (m)			Depth (m)					
			Qx (l/s)	Qx (cms)	Qmin	Qmax	vmin	vmax	vx	Qmin	Qmax	dmin	dmax	dx	dmin	dmax	dx	(m^2/s)	(m)	(m)
S311A	20	1.52	**49**	0.049	0.039	0.084	0.699	0.847	**0.73**	N/A	N/A	N/A	N/A	**N/A**	0.041	0.055	**0.044**	**0.03**	0.00	0.04
S310A	20	1.22	**0**	0.000	0.000	0.002	0.000	0.301	**0.00**	0.000	0.001	0.000	0.001	**0.000**	N/A	N/A	**N/A**	**0.00**	0.29	0.29
S309	20	0.60	**43**	0.043	0.024	0.053	0.439	0.532	**0.50**	N/A	N/A	N/A	N/A	**N/A**	0.041	0.055	**0.050**	**0.03**	0.00	0.05
S308	20	1.84	**65**	0.065	0.043	0.092	0.769	0.932	**0.84**	N/A	N/A	N/A	N/A	**N/A**	0.041	0.055	**0.047**	**0.04**	0.00	0.05
S308A	20	0.71	**26**	0.026	0.009	0.027	0.365	0.478	**0.47**	0.021	0.027	0.050	0.055	**0.054**	N/A	N/A	**N/A**	**0.03**	0.26	0.31
S340	20	2.40	**50**	0.050	0.049	0.105	0.878	1.064	**0.88**	N/A	N/A	N/A	N/A	**N/A**	0.041	0.055	**0.041**	**0.04**	0.00	0.04
S205C	24	0.71	**37**	0.037	0.024	0.053	0.439	0.532	**0.48**	N/A	N/A	N/A	N/A	**N/A**	0.041	0.055	**0.047**	**0.02**	0.00	0.05
S231	20	0.53	**100**	0.100	0.096	0.155	0.617	0.697	**0.62**	N/A	N/A	N/A	N/A	**N/A**	0.068	0.082	**0.069**	**0.04**	0.00	0.07
S207	24	0.51	**61**	0.061	0.053	0.096	0.532	0.617	**0.55**	N/A	N/A	N/A	N/A	**N/A**	0.055	0.068	**0.057**	**0.03**	0.00	0.06

Velocity x Depth Calculation

Iteration equation:

Velocity:

$$v_x = v_{min} + \frac{Q_x - Q_{min}}{Q_{max} - Q_{min}}(v_{max} - v_{min})$$

Depth:

$$d_x = d_{min} + \frac{Q_x - Q_{min}}{Q_{max} - Q_{min}}(d_{max} - d_{min})$$

100 Year 3 Hour Chicago Storm + 20%																				
					SWMHYMO (118863VD.OUT)					Calculation Sheet: Overflow for Typical Road Ponding Area					SWMHYMO (118863VD.OUT)			Velocity x Depth	Maximum Static Ponding Depth	Total Depth (Static + Dynamic)
Area ID (Dummy Segment, if applicable)	Road ROW Section	Longitudinal Slope (%)	Overflow Flowrate		Flowrate (cms)		Velocity (m/s)			Flowrate (cms)		Depth (m)			Depth (m)					
			Qx (l/s)	Qx (cms)	Qmin	Qmax	vmin	vmax	vx	Qmin	Qmax	dmin	dmax	dx	dmin	dmax	dx	(m^2/s)	(m)	(m)
S311A	20	1.52	**66**	0.066	0.039	0.084	0.699	0.847	**0.79**	N/A	N/A	N/A	N/A	**N/A**	0.041	0.055	**0.049**	**0.04**	0.00	0.05
S310A	20	1.22	**33**	0.033	0.012	0.035	0.478	0.626	**0.61**	0.028	0.035	0.055	0.060	**0.059**	N/A	N/A	**N/A**	**0.04**	0.29	0.35
S309	20	0.60	**71**	0.071	0.053	0.096	0.532	0.617	**0.57**	N/A	N/A	N/A	N/A	**N/A**	0.055	0.068	**0.060**	**0.03**	0.00	0.06
S308	20	1.84	**216**	0.216	0.167	0.272	1.081	1.221	**1.15**	N/A	N/A	N/A	N/A	**N/A**	0.068	0.082	**0.075**	**0.09**	0.00	0.07
S308A	20	0.71	**268**	0.268	0.255	0.364	0.841	0.919	**1.29**	0.240	0.269	0.125	0.130	**0.130**	N/A	N/A	**N/A**	**0.17**	0.26	0.39
S340	20	2.40	**98**	0.098	0.049	0.105	0.878	1.064	**1.04**	N/A	N/A	N/A	N/A	**N/A**	0.041	0.055	**0.053**	**0.06**	0.00	0.05
S205C	24	0.71	**46**	0.046	0.024	0.053	0.439	0.532	**0.51**	N/A	N/A	N/A	N/A	**N/A**	0.041	0.055	**0.052**	**0.03**	0.00	0.05
S231	20	0.53	**165**	0.165	0.155	0.234	0.697	0.773	**0.71**	N/A	N/A	N/A	N/A	**N/A**	0.082	0.095	**0.084**	**0.06**	0.00	0.08
S207	24	0.51	**89**	0.089	0.053	0.096	0.532	0.617	**0.60**	N/A	N/A	N/A	N/A	**N/A**	0.055	0.068	**0.066**	**0.04**	0.00	0.07

Storm Hydraulic Grade Line Elevations

XPSWMM NODE ID	MH NO.	PROPOSED GROUND ELEVATION (M)	USF (M)	100 YEAR 3 HOUR CHICAGO		100 YEAR 3 HOUR CHICAGO INCREASED BY 20%		100 YEAR 24 HOUR SCS TYPE II		100 YEAR 24 HOUR SCS TYPE II + 20%		JULY 1 1979		AUGUST 1988		AUGUST 1996	
				HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)
Phase 1B																	
S143	143	102.40	100.00	98.16	1.84	98.16	1.84	98.16	1.84	98.16	1.84	98.16	1.84	98.16	1.84	98.16	1.84
S144	144	99.41	97.01	95.79	1.22	95.79	1.22	95.78	1.23	95.79	1.22	95.78	1.23	95.79	1.22	95.78	1.23
S145	145	97.64	95.24	93.01	2.23	93.01	2.23	93.01	2.23	93.01	2.23	93.00	2.24	93.01	2.23	93.00	2.24
S146	146	95.28	92.88	90.96	1.92	91.82	1.06	90.77	2.11	91.26	1.62	90.91	1.97	91.01	1.87	90.63	2.25
S147	147	93.27	N/A	90.93	N/A	91.78	N/A	90.72	N/A	91.23	N/A	90.88	N/A	90.98	N/A	90.60	N/A
USBRM	N/A	N/A	N/A	90.88	N/A	91.72	N/A	90.67	N/A	91.17	N/A	90.83	N/A	90.93	N/A	90.56	N/A
BURMA	N/A	N/A	N/A	89.41	N/A	89.87	N/A	89.24	N/A	89.53	N/A	89.43	N/A	89.31	N/A	89.04	N/A
OUTLET	N/A	N/A	N/A	89.26	N/A	89.75	N/A	89.07	N/A	89.39	N/A	89.29	N/A	89.15	N/A	88.65	N/A
S152	152	92.73	90.33	89.71	0.62	89.71	0.62	89.71	0.62	89.71	0.62	89.71	0.62	89.71	0.62	89.71	0.62
S151	151	92.50	90.10	89.58	0.52	89.57	0.53	89.58	0.52	89.58	0.52	89.58	0.52	89.58	0.52	89.57	0.53
S150	150	92.32	89.92	89.49	0.43	89.48	0.44	89.49	0.43	89.49	0.43	89.49	0.43	89.49	0.43	89.49	0.43
S149	149	92.34	89.94	89.42	0.52	89.42	0.52	89.42	0.52	89.42	0.52	89.42	0.52	89.42	0.52	89.42	0.52
S148	148	92.14	89.74	89.30	0.44	89.29	0.45	89.30	0.44	89.30	0.44	89.30	0.44	89.30	0.44	89.30	0.44
S157	157	91.24	N/A	89.21	N/A	89.20	N/A	89.21	N/A	89.21	N/A	89.21	N/A	89.21	N/A	89.21	N/A
S154	154	91.02	N/A	87.68	N/A	87.68	N/A	87.68	N/A	87.68	N/A	87.68	N/A	87.68	N/A	87.68	N/A
S215	215	90.77	88.37	87.58	0.79	87.58	0.79	87.58	0.79	87.58	0.79	87.58	0.79	87.58	0.79	87.58	0.79
S216	216	90.85	88.45	87.30	1.15	87.30	1.15	87.30	1.15	87.30	1.15	87.30	1.15	87.31	1.14	87.30	1.15
S217	217	90.66	88.26	87.13	1.13	87.18	1.08	87.12	1.14	87.15	1.11	87.14	1.12	87.13	1.13	87.12	1.14
S218	218	90.40	88.00	87.04	0.96	87.10	0.90	87.02	0.98	87.06	0.94	87.05	0.95	87.04	0.96	87.02	0.98
S219	219	90.08	87.68	86.85	0.83	86.94	0.74	86.82	0.86	86.88	0.80	86.86	0.82	86.84	0.84	86.81	0.87
S220	220	89.86	87.46	86.74	0.72	86.84	0.62	86.70	0.76	86.78	0.68	86.75	0.71	86.72	0.74	86.68	0.78
S221	221	89.88	87.48	86.57	0.91	86.72	0.76	86.51	0.97	86.63	0.85	86.59	0.89	86.54	0.94	86.36	1.12
S222	222	89.86	87.46	86.38	1.08	86.51	0.95	86.32	1.14	86.43	1.03	86.39	1.07	86.35	1.11	86.19	1.27
S200	200	94.71	92.31	90.73	1.58	90.74	1.57	90.73	1.58	90.72	1.59	90.73	1.58	90.72	1.59	90.73	1.58
S214	214	93.52	91.12	90.26	0.86	90.28	0.84	90.26	0.86	90.27	0.85	90.26	0.86	90.26	0.86	90.26	0.86
MH201	201	94.29	91.89	90.72	1.17	90.73	1.16	90.72	1.17	90.72	1.17	90.72	1.17	90.72	1.17	90.71	1.18
MH202	202	93.91	91.51	90.42	1.09	90.43	1.08	90.41	1.10	90.42	1.09	90.41	1.10	90.41	1.10	90.40	1.11
MH203	203	92.38	89.98	88.66	1.32	88.68	1.30	88.63	1.35	88.66	1.32	88.63	1.35	88.64	1.34	88.61	1.37
MH204	204	90.40	88.00	87.08	0.92	87.10	0.90	87.06	0.94	87.08	0.92	87.06	0.94	87.07	0.93	87.02	0.98
MH205	205	89.35	86.95	85.86	1.09	85.88	1.07	85.83	1.12	85.86	1.09	85.84	1.11	85.84	1.11	85.77	1.18
MH206	206	89.10	86.70	85.65	1.05	85.65	1.05	85.62	1.08	85.65	1.05	85.63	1.07	85.63	1.07	85.57	1.13
MH207	207	88.53	86.13	84.65	1.48	84.65	1.48	84.62	1.51	84.65	1.48	84.63	1.50	84.64	1.49	84.58	1.55
S212	212	90.25	87.85	86.86	0.99	86.87	0.98	86.83	1.02	86.85	1.00	86.83	1.02	86.84	1.01	86.82	1.03
S213	213	89.74	87.34	86.45	0.89	86.45	0.89	86.43	0.91	86.45	0.89	86.44	0.90	86.44	0.90	86.42	0.92
S210	210	89.14	86.74	86.43	0.31	86.43	0.31	86.42	0.32	86.43	0.31	86.42	0.32	86.43	0.31	86.41	0.33
S211	211	89.15	86.75	85.94	0.81	85.93	0.82	85.93	0.82	85.94	0.81	85.93	0.82	85.93	0.82	85.92	0.83
S208	208	88.77	86.37	85.92	0.45	85.91	0.46	85.78	0.59	85.91	0.46	85.81	0.56	85.88	0.49	85.70	0.67
S209	209	88.75	86.35	85.46	0.89	85.45	0.90	85.41	0.94	85.46	0.89	85.42	0.93	85.45	0.90	85.38	0.97
MH231	231	89.81	87.41	85.61	1.79	85.64	1.77	85.73	1.67	85.78	1.63	85.84	1.57	85.77	1.63	85.71	1.69

Storm Hydraulic Grade Line Elevations

XPSWMM NODE ID	MH NO.	PROPOSED GROUND ELEVATION (M)	USF (M)	100 YEAR 3 HOUR CHICAGO		100 YEAR 3 HOUR CHICAGO INCREASED BY 20%		100 YEAR 24 HOUR SCS TYPE II		100 YEAR 24 HOUR SCS TYPE II + 20%		JULY 1 1979		AUGUST 1988		AUGUST 1996	
				HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)
Wateridge Village Phase 1A																	
S153	153	92.78	90.38	89.45	0.93	89.46	0.92	89.44	0.94	89.45	0.93	89.44	0.94	89.45	0.93	89.44	0.94
S160	160	92.27	89.87	89.01	0.86	89.02	0.85	89.01	0.86	89.01	0.86	89.01	0.86	89.01	0.86	89.00	0.87
S161	161	91.94	89.54	88.57	0.97	88.58	0.96	88.57	0.97	88.57	0.97	88.57	0.97	88.57	0.97	88.57	0.97
S162	162	91.34	88.94	88.26	0.68	88.26	0.68	88.25	0.69	88.26	0.68	88.25	0.69	88.26	0.68	88.25	0.69
S163	163	90.94	88.54	87.68	0.86	87.68	0.86	87.68	0.86	87.68	0.86	87.68	0.86	87.68	0.86	87.68	0.86
S164	164	90.22	87.82	87.00	0.82	87.01	0.81	86.99	0.83	87.00	0.82	87.00	0.82	87.00	0.82	86.99	0.83
S165B	165	89.61	87.21	86.45	0.76	86.45	0.76	86.44	0.77	86.44	0.77	86.44	0.77	86.44	0.77	86.44	0.77
S165	165	89.30	86.90	85.98	0.92	86.05	0.85	85.93	0.97	86.01	0.89	85.99	0.91	85.96	0.94	85.83	1.07
S166	166	88.90	86.50	84.88	1.62	85.03	1.47	84.78	1.72	84.93	1.57	84.88	1.62	84.85	1.65	84.59	1.91
S167	167	88.40	86.00	84.71	1.29	84.86	1.14	84.60	1.40	84.76	1.24	84.71	1.29	84.67	1.33	84.39	1.61
S168	168	87.70	85.30	84.54	0.76	84.66	0.64	84.43	0.87	84.58	0.72	84.54	0.76	84.50	0.80	84.22	1.08
S141	141	87.32	84.92	84.28	0.64	84.39	0.53	84.18	0.74	84.32	0.60	84.28	0.64	84.25	0.67	83.97	0.95
S142	142	87.52	85.12	84.02	1.10	84.12	1.00	83.94	1.18	84.06	1.06	84.03	1.09	84.00	1.12	83.74	1.38
MH176	176	88.03	85.63	83.77	1.86	83.85	1.78	83.69	1.94	83.80	1.83	83.77	1.86	83.75	1.88	83.49	2.14
MH178	178	89.00	86.60	83.41	3.19	83.47	3.13	83.34	3.26	83.44	3.16	83.41	3.19	83.39	3.21	83.18	3.42
MH180	180	88.23	85.83	82.20	3.62	82.44	3.38	81.98	3.84	82.27	3.56	82.21	3.62	82.10	3.73	81.49	4.34
MH190	190	88.10	85.70	81.90	3.80	82.12	3.58	81.65	4.05	81.97	3.73	81.91	3.79	81.80	3.90	81.23	4.47
MH191	191	86.36	83.96	81.66	2.30	81.86	2.10	81.44	2.52	81.73	2.23	81.67	2.29	81.56	2.40	81.06	2.91
MH192	192	85.92	83.52	81.41	2.11	81.59	1.93	81.21	2.31	81.47	2.05	81.41	2.11	81.31	2.21	80.89	2.63
MH193	193	84.85	82.45	81.09	1.36	81.24	1.21	80.92	1.53	81.14	1.31	81.09	1.36	81.00	1.45	80.60	1.85
MH194	194	82.44	N/A	80.45	N/A	80.53	N/A	80.35	N/A	80.48	N/A	80.46	N/A	80.40	N/A	80.13	N/A
S130	130		N/A	101.25	N/A	101.25	N/A	101.24	N/A	101.25	N/A	101.24	N/A	101.24	N/A	101.23	N/A
S131	131		N/A	101.05	N/A	101.05	N/A	101.04	N/A	101.05	N/A	101.04	N/A	101.04	N/A	101.03	N/A
S132	132		N/A	99.64	N/A	99.64	N/A	99.64	N/A	99.64	N/A	99.64	N/A	99.64	N/A	99.63	N/A
S133	133		N/A	96.52	N/A	96.52	N/A	96.51	N/A	96.52	N/A	96.51	N/A	96.51	N/A	96.50	N/A
S134	134		N/A	93.01	N/A	93.01	N/A	93.00	N/A	93.01	N/A	93.00	N/A	93.00	N/A	92.99	N/A
S135	135		N/A	90.11	N/A	90.11	N/A	90.10	N/A	90.11	N/A	90.10	N/A	90.10	N/A	90.09	N/A
S136	136		N/A	87.38	N/A	87.38	N/A	87.37	N/A	87.38	N/A	87.37	N/A	87.37	N/A	87.37	N/A
S137	137		86.91	85.77	1.14	85.77	1.14	85.76	1.15	85.77	1.14	85.76	1.15	85.77	1.14	85.76	1.15
S138	138		86.31	84.96	1.35	84.96	1.35	84.95	1.36	84.96	1.35	84.95	1.36	84.95	1.36	84.94	1.37
S139	139		85.66	84.46	1.20	84.48	1.18	84.46	1.20	84.46	1.20	84.46	1.20	84.46	1.20	84.45	1.21
S140	140		N/A	84.35	N/A	84.42	N/A	84.34	N/A	84.37	N/A	84.35	N/A	84.34	N/A	84.34	N/A
S100	100		87.16	85.70	1.46	85.69	1.47	85.70	1.46	85.70	1.46	85.70	1.46	85.70	1.46	85.70	1.46
S108	108		86.66	85.24	1.43	85.23	1.43	85.23	1.43	85.24	1.42	85.23	1.43	85.23	1.43	85.23	1.43
S109	109		85.36	84.05	1.31	84.05	1.31	84.05	1.31	84.05	1.31	84.05	1.31	84.05	1.31	84.05	1.31
S117	117		85.06	83.54	1.52	83.58	1.48	83.53	1.53	83.54	1.52	83.53	1.53	83.54	1.52	83.53	1.53
S118	118		84.71	83.21	1.50	83.48	1.23	83.20	1.51	83.25	1.46	83.22	1.49	83.21	1.50	83.20	1.51
S101	101		87.16	85.55	1.61	85.55	1.61	85.54	1.62	85.55	1.61	85.54	1.62	85.54	1.62	85.54	1.62
S102	102		86.46	84.72	1.74	84.72	1.74	84.71	1.75	84.72	1.74	84.71	1.75	84.71	1.75	84.70	1.76
S119	119		85.46	83.95	1.51	83.95	1.51	83.95	1.51	83.95	1.51	83.94	1.52	83.95	1.51	83.95	1.51
S104	104		N/A	85.90	N/A	85.89	N/A	85.89	N/A	85.90	N/A	85.89	N/A	85.89	N/A	85.88	N/A

Storm Hydraulic Grade Line Elevations

XPSWMM NODE ID	MH NO.	PROPOSED GROUND ELEVATION (M)	USF (M)	100 YEAR 3 HOUR CHICAGO		100 YEAR 3 HOUR CHICAGO INCREASED BY 20%		100 YEAR 24 HOUR SCS TYPE II		100 YEAR 24 HOUR SCS TYPE II + 20%		JULY 1 1979		AUGUST 1988		AUGUST 1996	
				HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)
S103	103		86.46	84.36	2.10	84.36	2.10	84.34	2.12	84.36	2.10	84.35	2.11	84.35	2.11	84.34	2.12
S105	105		85.71	83.90	1.81	83.91	1.80	83.89	1.82	83.90	1.81	83.89	1.82	83.90	1.81	83.89	1.82
S122	122		84.86	83.53	1.33	83.53	1.33	83.53	1.33	83.53	1.33	83.53	1.33	83.53	1.33	83.53	1.33
S121	121		84.26	82.80	1.46	83.03	1.23	82.43	1.83	82.82	1.44	82.77	1.49	82.61	1.65	81.98	2.28
S127	127		84.36	82.67	1.69	82.92	1.44	82.34	2.02	82.71	1.65	82.66	1.70	82.51	1.85	81.85	2.51
S128	128		N/A	82.61	N/A	82.86	N/A	82.30	N/A	82.67	N/A	82.61	N/A	82.47	N/A	81.81	N/A
S107	107		N/A	85.29	N/A	85.29	N/A	85.28	N/A	85.29	N/A	85.28	N/A	85.28	N/A	85.27	N/A
S106	106		85.61	83.76	1.85	83.75	1.86	83.73	1.88	83.76	1.85	83.74	1.87	83.75	1.86	83.73	1.88
S124	124		85.69	83.94	1.75	83.94	1.75	83.93	1.76	83.94	1.75	83.93	1.76	83.93	1.76	83.92	1.77
S125	125		85.34	83.37	1.97	83.38	1.96	83.35	1.99	83.37	1.97	83.36	1.98	83.36	1.98	83.35	1.99
S126	126		84.96	82.87	2.09	83.14	1.82	82.85	2.11	82.89	2.07	82.85	2.11	82.86	2.10	82.84	2.12
S182	182		N/A	82.46	N/A	82.70	N/A	82.18	N/A	82.52	N/A	82.46	N/A	82.32	N/A	81.68	N/A
S181	181		N/A	82.36	N/A	82.61	N/A	82.11	N/A	82.43	N/A	82.37	N/A	82.24	N/A	81.61	N/A
S110	110		85.56	83.59	1.97	83.80	1.76	83.59	1.97	83.59	1.97	83.59	1.97	83.59	1.97	83.59	1.97
S111	111		84.96	83.59	1.37	83.80	1.16	83.58	1.38	83.59	1.37	83.58	1.38	83.59	1.37	83.58	1.38
S112	112		84.91	83.40	1.52	83.77	1.14	83.18	1.73	83.50	1.41	83.42	1.49	83.22	1.69	83.22	1.69
S113	113		84.51	83.41	1.10	83.74	0.77	83.06	1.45	83.48	1.03	83.40	1.11	83.08	1.43	83.05	1.46
S114	114		83.91	83.06	0.85	83.31	0.60	82.66	1.25	83.11	0.80	83.04	0.87	82.85	1.06	82.49	1.42
S115	115		83.56	83.04	0.52	83.33	0.23	82.64	0.92	83.13	0.43	83.01	0.55	82.83	0.73	82.45	1.11
S116	116		83.71	82.88	0.83	83.16	0.55	82.51	1.20	82.92	0.79	82.85	0.86	82.70	1.01	82.10	1.61
S120	120		83.96	82.86	1.10	83.08	0.88	82.48	1.48	82.88	1.08	82.83	1.13	82.67	1.29	82.06	1.90

Storm Hydraulic Grade Line Elevations

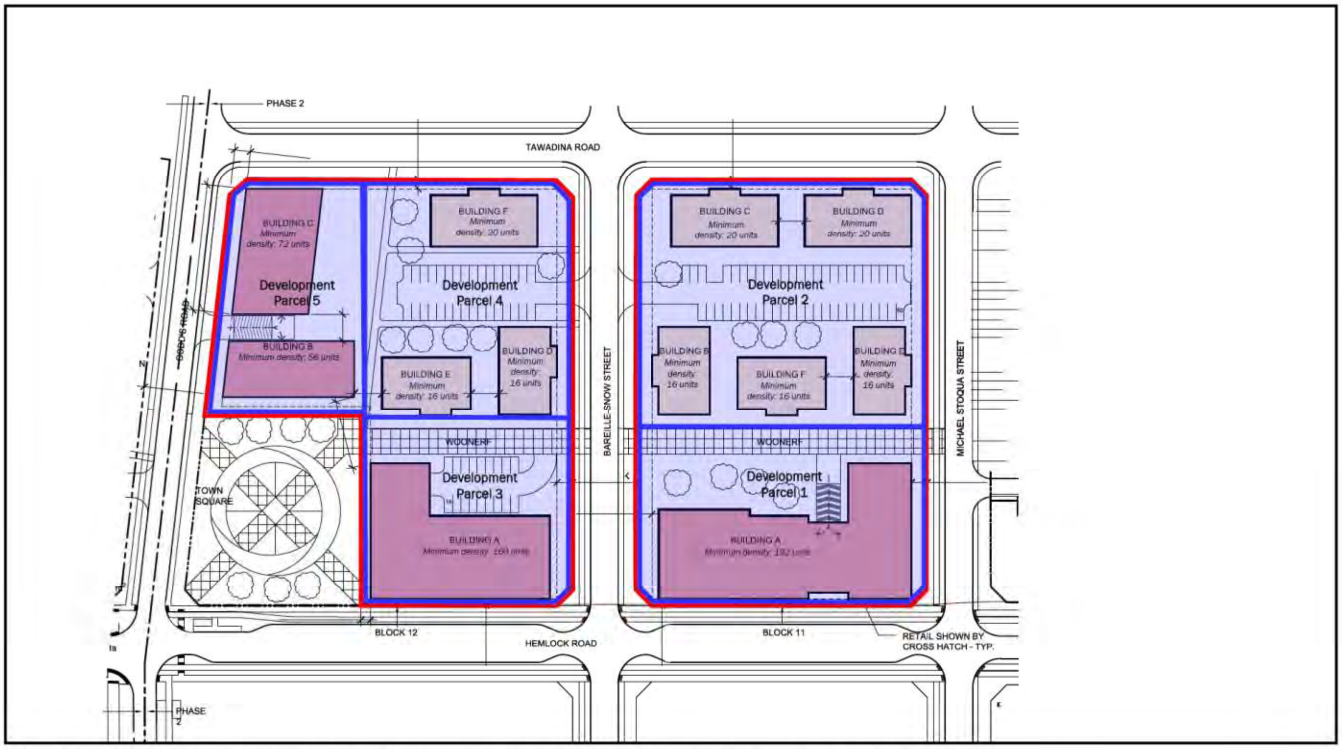
XPSWMM NODE ID	MH NO.	PROPOSED GROUND ELEVATION (M)	USF (M)	100 YEAR 3 HOUR CHICAGO		100 YEAR 3 HOUR CHICAGO INCREASED BY 20%		100 YEAR 24 HOUR SCS TYPE II		100 YEAR 24 HOUR SCS TYPE II + 20%		JULY 1 1979		AUGUST 1988		AUGUST 1996	
				HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)	HGL (M)	USF - HGL (M)
Phase 2B, 4																	
MH317	317	94.08	91.68	91.17	0.51	91.18	0.50	91.14	0.54	91.15	0.53	91.15	0.53	91.14	0.54	91.11	0.57
MH316	316	94.09	91.69	90.96	0.73	90.96	0.73	90.95	0.74	90.95	0.74	90.95	0.74	90.95	0.74	90.92	0.77
MH315	315	93.39	91.36	90.28	1.08	90.29	1.07	90.25	1.11	90.26	1.10	90.27	1.09	90.27	1.09	90.26	1.10
MH314	314	93.00	91.16	89.91	1.25	89.91	1.25	89.91	1.25	89.91	1.25	89.91	1.25	89.91	1.25	89.89	1.27
MH313	313	92.62	90.71	89.35	1.36	89.34	1.37	89.35	1.36	89.35	1.36	89.35	1.36	89.35	1.36	89.34	1.37
MH312	312	91.36	89.68	88.42	1.26	88.42	1.26	88.41	1.27	88.42	1.26	88.42	1.26	88.42	1.26	88.38	1.30
MH311	311	90.69	88.29	87.44	0.85	87.56	0.73	87.40	0.89	87.48	0.81	87.45	0.84	87.47	0.82	87.38	0.91
MH310	310	90.04	87.64	87.28	0.36	87.42	0.22	87.25	0.39	87.35	0.29	87.30	0.34	87.33	0.31	87.06	0.58
MH309	309	90.15	87.75	87.44	0.31	87.08	0.67	87.33	0.42	87.44	0.31	87.41	0.34	87.43	0.32	87.22	0.53
MH308	308	89.68	87.28	86.88	0.40	86.69	0.59	86.81	0.47	86.88	0.40	86.87	0.41	86.88	0.40	86.76	0.52
MH326	326	94.76	92.36	91.33	1.03	91.33	1.03	91.32	1.04	91.32	1.04	91.32	1.04	91.32	1.04	91.33	1.03
MH318	318	94.40	92.00	91.03	0.97	91.03	0.97	91.00	1.00	91.03	0.97	91.00	1.00	91.00	1.00	91.00	1.00
MH300	300	94.00	91.60	90.71	0.89	90.70	0.90	90.67	0.93	90.70	0.90	90.68	0.92	90.68	0.92	90.68	0.92
MH301	301	93.73	91.33	90.21	1.12	90.21	1.12	90.20	1.13	90.20	1.13	90.21	1.12	90.20	1.13	90.20	1.13
MH302	302	92.80	90.40	88.64	1.76	88.64	1.76	88.63	1.77	88.63	1.77	88.64	1.76	88.63	1.77	88.63	1.77
MH303	303	90.67	88.27	87.80	0.47	87.81	0.46	87.63	0.64	87.65	0.62	87.79	0.48	87.72	0.55	87.64	0.63
MH304	304	90.30	87.90	87.39	0.51	87.38	0.52	87.30	0.60	87.31	0.59	87.38	0.52	87.34	0.56	87.30	0.60
MH305	305	91.00	88.60	86.54	2.06	86.56	2.04	86.61	1.99	86.64	1.96	86.69	1.91	86.65	1.95	86.60	2.00
MH319	319	88.81	86.61	86.13	0.48	86.12	0.49	86.12	0.49	86.13	0.48	86.12	0.49	86.12	0.49	86.12	0.49
MH320	320	89.12	86.92	85.49	1.43	85.49	1.43	85.49	1.43	85.49	1.43	85.49	1.43	85.49	1.43	85.49	1.43
MH321	321	87.67	85.47	84.18	1.29	84.39	1.08	84.10	1.37	84.15	1.32	84.11	1.36	84.13	1.34	84.09	1.38
MH322	322	87.50	85.30	84.18	1.12	84.39	0.91	84.10	1.20	84.15	1.15	84.10	1.20	84.12	1.18	84.09	1.21
MH323	323	86.57	84.37	83.40	0.97	83.48	0.89	83.31	1.06	83.37	1.00	83.32	1.05	83.34	1.03	83.30	1.07

Appendix B

Supporting Sanitary Information

SCHEDULE "A"

PARCEL IDENTIFICATION, DESCRIPTION, AND MINIMUM DENSITY[1]



**Boundaries of the development parcels are estimated. Purchasers to provide dimensioned sketch or electronic survey to confirm these boundaries

[1] This image if provided for demonstration purposes only

IBI GROUP
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LEGEND
Block 11&12 Proposed Conditions
Old Criteria being used

AS-BUILT SANITARY SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Canada Lands Company

LOCATION				RESIDENTIAL										ICI AREAS							INFILTRATION ALLOWANCE			FIXED	TOTAL	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		PEAK	PEAK	AREA (Ha)						PEAK	AREA (Ha)		FLOW	FLOW	FLOW	CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
														INSTITUTIONAL		COMMERCIAL		INDUSTRIAL														
STREET	AREA ID	FROM MH	TO MH	Phase 1B (Ha)	SF	SD	TH	APT	EXTERNAL (Ha)	IND	CUM	FACTOR	FLOW (L/s)	IND	CUM	IND	CUM	IND	CUM	FLOW (L/s)	IND	CUM	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
Phase 1B																																
rue Michael Stoqua Street	EX205A	BULK205AN	MH205A						0.66	33.1	33.1	4.00	0.54		0.00		0.00		0.00	0.00	0.66	0.66	0.18	0.00	0.72	66.24	21.00	250	1.14	1.307	65.52	98.91%
Hemlock Road	205A	MH205A	MH206A	0.25						0.0	186.6	4.00	3.02		0.00		0.00		0.00	0.00	0.25	2.51	0.70	0.00	3.73	31.02	111.90	250	0.25	0.612	27.29	87.99%
rue Bareille-Snow Street	EX206A-B	BULK206AN	MH206A						9.79	2598.3	2598.3	3.49	36.78		0.00		0.00		0.00	0.00	9.79	9.79	2.74	0.00	39.52	88.83	21.00	250	2.05	1.753	49.30	55.50%
Hemlock Road	206A	MH206A	MH207A	0.20						0.0	2784.9	3.47	39.14		0.00		0.00		0.00	0.00	0.20	12.50	3.50	0.00	42.64	100.88	89.30	300	1.00	1.383	58.24	57.73%
Block 20	PARK1	MH207AN	MH207A	0.32						0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.32	0.32	0.09	0.00	0.09	50.02	13.80	250	0.65	0.987	49.93	99.82%
Hemlock Road	PARK1, 207A	MH207A	*BULK176AE*	0.12						0.0	2784.9	3.47	39.14		0.00		0.00		0.00	0.00	0.12	12.94	3.62	0.00	42.77	134.59	33.10	300	1.78	1.845	91.83	68.23%
Phase 1A																																
Hemlock Road		*BULK176AE*	*MH176A*							0.0	2784.9	3.47	39.14		0.00		0.00		0.00	0.00	0.00	12.94	3.62	0.00	42.77	65.38	*21.97*	*300*	*0.42*	0.896	22.61	34.59%
Phase 1B																																
chemin Wanaki Road	200A, COM1	MH200A	MH214A	0.25						0.0	0.0	4.00	0.00		0.00	0.90	0.90		0.00	0.78	1.15	1.15	0.32	0.00	1.10	71.01	98.50	250	1.31	1.401	69.90	98.45%
chemin Wanaki Road	214A, COM2	MH214A	*BULK153AN*	0.16						0.0	0.0	4.00	0.00		0.00	0.65	1.55		0.00	1.35	0.81	1.96	0.55	0.00	1.89	57.20	44.60	250	0.85	1.129	55.30	96.69%
Phase 1A																																
chemin Wanaki Road	COM2	*BULK153AN*	*MH153A*							0.0	0.0	4.00	0.00		0.00		1.55		0.00	1.35	0.00	1.96	0.55	0.00	1.89	51.91	*20.13*	*250*	*0.70*	1.024	50.01	96.35%
chemin Wanaki Road	153A, COM3	*MH153A*	*MH151A*	0.21						0.0	0.0	4.00	0.00		0.00	0.88	2.43		0.00	2.11	1.09	3.05	0.85	0.00	2.96	36.70	*85.04*	*250*	*0.35*	0.724	33.74	91.93%
chemin Wanaki Road	151A, COM4	*MH151A*	*MH150A*	0.11						0.0	0.0	4.00	0.00		0.00	0.45	2.88		0.00	2.50	0.56	3.61	1.01	0.00	3.51	36.70	*40.97*	*250*	*0.35*	0.724	33.19	90.43%
chemin Wanaki Road	150A, COM5	*MH150A*	*MH149A*	0.11						0.0	0.0	4.00	0.00		0.00	0.95	3.83		0.00	3.32	1.06	4.67	1.31	0.00	4.63	36.70	*41.34*	*250*	*0.35*	0.724	32.07	87.38%
chemin Wanaki Road	149A	*MH149A*	*MH148A*	0.10						0.0	0.0	4.00	0.00		0.00		3.83		0.00	3.32	0.10	4.77	1.34	0.00	4.66	36.70	*40.04*	*250*	*0.35*	0.724	32.04	87.30%
chemin Wanaki Road	148A	*MH148A*	*MH157A*	0.04						0.0	0.0	4.00	0.00		0.00		3.83		0.00	3.32	0.04	4.81	1.35	0.00	4.67	36.70	*20.58*	*250*	*0.35*	0.724	32.03	87.27%
Phase 1B																																
chemin Wanaki Road	143B	BULK143AE	MH143A	0.31						104.0	104.0	4.00	1.69		0.00		0.00		0.00	0.00	0.31	0.31	0.09	0.00	1.77	43.87	21.50	250	0.50	0.866	42.10	95.96%
chemin Wanaki Road	143A	MH143A	MH144A	0.27						0.0	104.0	4.00	1.69		0.00		0.00		0.00	0.00	0.27	0.58	0.16	0.00	1.85	83.69	34.70	250	1.82	1.652	81.85	97.79%
chemin Wanaki Road	144A, 144B	MH144A	MH145A	0.72						0.0	104.0	4.00	1.69		0.00		0.00		0.00	0.00	0.72	1.30	0.36	0.00	2.05	88.61	41.10	250	2.04	1.749	86.56	97.69%
chemin Wanaki Road	145A, 145B, 145C	MH145A	MH146A	2.77						835.6	939.6	3.82	14.53		0.00		0.00		0.00	0.00	2.77	4.07	1.14	0.00	15.67	105.83	53.30	250	2.91	2.089	90.16	85.19%
chemin Wanaki Road	146A	MH146A	MH147A	0.14						0.0	939.6	3.82	14.53		0.00		0.00		0.00	0.00	0.14	4.21	1.18	0.00	15.71	43.54	37.30	250	0.97	1.206	27.83	63.92%
chemin Wanaki Road	PARK2	BLK147AE	MH147A	0.55						0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.55	0.55	0.15	0.00	0.15	39.24	17.70	250	0.40	0.774	39.08	99.61%
chemin Wanaki Road	147C	BLK147AW	MH147A	0.10						33.6	33.6	4.00	0.54		0.00		0.00		0.00	0.00	0.10	0.10	0.03	0.00	0.57	41.62	17.70	250	0.45	0.821	41.04	98.62%
chemin Wanaki Road	147A	MH147A	MH170A	0.03						0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.03	4.89	1.37	0.00	16.38	38.74	10.30	250	0.39	0.765	22.36	57.72%
chemin Wanaki Road	147B	MH170A	MH147C	0.16						0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.16	5.05	1.41	0.00	16.42	31.63	38.20	250	0.26	0.624	15.21	48.08%
chemin Wanaki Road		MH147C	*BLK148AW*							0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.00	5.05	1.41	0.00	16.42	46.01	11.80	250	0.55	0.908	29.58	64.30%
Phase 1A																																
chemin Wanaki Road		*BULK148AW*	*MH157A*							0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.00	5.05	1.41	0.00	16.42	62.04	*8.00*	*250*	*1.00*	1.224	45.61	73.52%
chemin Wanaki Road	157A	*MH157A*	*MH158A*	0.05						0.0	973.2	3.81	15.01		0.00		3.83		0.00	3.32	0.05	9.91	2.77	0.00	21.11	31.02	*25.68*	*250*	*0.25*	0.612	9.91	31.94%
Street No. 2	INST1	*BULK158AN*	*MH158A*							0.0	0.0	4.00	0.00	2.62	2.62		0.00		0.00	2.27	2.62	2.62	0.73	0.00	3.01	39.24	*15.10*	*250*	*0.40*	0.774	36.23	92.33%
chemin Wanaki Road	158A	*MH158A*	*MH154A*	0.22						0.0	973.2	3.81	15.01		2.62		3.83		0.00	5.60	0.22	12.75	3.57	0.00	24.18	31.02	*68.91*	*250*	*0.25*	0.612	6.84	22.05%

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LEGEND

Block 11&12 Proposed Conditions
Old Criteria being used

AS-BUILT SANITARY SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Canada Lands Company

LOCATION: STREET	LOCATION: AREA ID	LOCATION: FROM MH	LOCATION: TO MH	RESIDENTIAL: AREA Phase 1B (Ha)	UNIT TYPES: SF	UNIT TYPES: SD	UNIT TYPES: TH	UNIT TYPES: APT	AREA EXTERNAL (Ha)	POPULATION: IND	POPULATION: CUM	PEAK FACTOR	PEAK FLOW (L/s)	ICI AREAS: INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	ICI PEAK FLOW (L/s)	INFILTRATION ALLOWANCE: AREA (Ha) IND	AREA (Ha) CUM	FLOW (L/s)	FIXED FLOW (L/s)	TOTAL FLOW (L/s)	PROPOSED SEWER DESIGN: CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY L/s	AVAILABLE CAPACITY (%)
Phase 1B																																
Block 9	154A	*Ex. BULK*	MH217Aa	0.19						0.0	973.2	3.81	15.01		2.62		3.83		0.00	5.60	0.19	12.94	3.62	0.00	24.23	104.37	*24.40*	250	*2.83*	2.060	80.13	76.78%
Block 9		MH217Aa	MH217A							0.0	973.2	3.81	15.01		2.62		3.83		0.00	5.60	0.00	12.94	3.62	0.00	24.23	62.66	*78.50*	250	*1.02*	1.237	38.42	61.32%
croissant Squadron Crescent	215Aa-b	MH215A	MH216A	0.79	3	4				117.8	117.8	4.00	1.91		0.00		0.00		0.00	0.00	0.79	0.79	0.22	0.00	2.13	55.49	*56.10*	250	*0.80*	1.095	53.36	96.16%
croissant Squadron Crescent	216Aa-b	MH216A	MH217A	0.67	2	6				94.5	212.3	4.00	3.44		0.00		0.00		0.00	0.00	0.67	1.46	0.41	0.00	3.85	46.01	*70.80*	250	*0.55*	0.908	42.16	91.63%
croissant Squadron Crescent	217A	MH217A	MH218A	0.02						0.0	1185.5	3.75	18.01		2.62		3.83		0.00	5.60	0.02	14.42	4.04	0.00	27.65	39.72	*9.70*	250	*0.41*	0.784	12.07	30.39%
croissant Squadron Crescent	218A	MH218A	MH218B	0.02						0.0	1185.5	3.75	18.01		2.62		3.83		0.00	5.60	0.02	14.44	4.04	0.00	27.66	39.24	*9.90*	250	*0.40*	0.774	11.58	29.51%
Thorncliffe Village	THORN1	MH600A	MH601A						5.55	1574.0	1574.0	3.66	23.36		0.00		0.00		0.00	0.00	5.55	19.99	5.60	0.00	28.96	69.16	*21.40*	300	*0.47*	0.948	40.20	58.12%
Thorncliffe Village		MH601A	MH218B							0.0	1574.0	3.66	23.36		0.00		0.00		0.00	0.00	0.00	19.99	5.60	0.00	28.96	108.18	*46.90*	300	*1.15*	1.483	79.22	73.23%
croissant Squadron Crescent	218B	MH218B	MH219A	0.07						0.0	2759.5	3.47	38.82		2.62		3.83		0.00	5.60	0.07	34.50	9.66	0.00	54.08	96.76	*40.20*	300	*0.92*	1.326	42.68	44.11%
croissant Squadron Crescent	219A	MH219A	MH220A	0.15						0.0	2759.5	3.47	38.82		2.62		3.83		0.00	5.60	0.15	34.65	9.70	0.00	54.12	66.92	*72.40*	300	*0.44*	0.917	12.79	19.12%
croissant Squadron Crescent	220A, 220B	MH220A	MH221A	1.46						319.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	1.46	36.11	10.11	0.00	58.52	74.82	*43.30*	300	*0.55*	1.025	16.30	21.78%
croissant Squadron Crescent	221A	MH221A	MH222A	0.02						0.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	0.02	36.13	10.12	0.00	58.53	64.60	*7.40*	300	*0.41*	0.885	6.07	9.40%
croissant Squadron Crescent		MH222A	MH223A							0.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	0.00	36.13	10.12	0.00	58.53	58.82	*81.60*	300	*0.34*	0.806	0.30	0.51%
croissant Squadron Crescent	BLOCK 15	BLK223AE	MH223A	Design by Others																						109.23	*10.00*	250	*3.10*	2.156	109.23	100.00%
croissant Squadron Crescent	222A	MH223A	*MH165A*	0.22						0.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	0.22	36.35	10.18	0.00	58.59	96.24	*36.10*	300	*0.91*	1.319	37.65	39.12%

Design Parameters:

Residential			ICI Areas			Peak Factor
SF	3.4	p/p/u	INST	50,000	L/Ha/day	1.5
TH/SD	2.7	p/p/u	COM	50,000	L/Ha/day	1.5
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day 300 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+P^0.5))
   where P = population in thousands

Designed: WY

Checked: JIM

Dwg. Reference: 38298-501

No.	Revision	Date
1.	City submission No. 1	2016-07-08
2.	City submission No. 2	2016-11-04
3.	City submission No. 3	2017-01-25
4.	Revised as per Mattamy's Design	2017-12-08
5.	As-Built Submission	2018-01-29
6.	Block 11 & 12 Study	2022-03-15

File Reference:	Date:	Sheet No:
38298.5.7.1	2016-07-08	1 of 2

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LEGEND

MH231A	Existing infrastructure (shown for information only)
	Block 11, 12 Existing Conditions

SANITARY SEWER DESIGN SHEET

Wateridge at Rockcliffe - Phase 2B
City of Ottawa
Canada Lands Company

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		RES	PEAK	AREA (Ha)						ICI	PEAK	AREA (Ha)		FLOW			FLOW	CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE	
		FROM	TO	w/ Units					w/o Units			PEAK	FLOW	INSTITUTIONAL		COMMERCIAL		INDUSTRIAL		PEAK	FLOW											(full)	CAPACITY	
STREET	AREA ID	MH	MH	(Ha)	SF	SD / TH/F	TH/S	APT	(Ha)	IND	CUM	FACTOR	(L/s)	IND	CUM	IND	CUM	IND	CUM	FACTOR	(L/s)	IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	L/s	(%)
Pimiwidon Street	MH317-1, MH317-2	MH317A	MH316A	1.50	1	104				284.2	284.2	3.47	3.20	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.50	1.50	0.50	0.00	0.00	3.69	40.68	*83.00*	*250*	*0.43*	0.803	36.99	90.93%
Pimiwidon Street	MH316A	MH316A	BULK202AN	0.16		1				2.7	286.9	3.47	3.23	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.16	1.66	0.55	0.00	0.00	3.77	37.74	*43.10*	*250*	*0.37*	0.745	33.96	90.00%
Pimiwidon Street	-	*BULK202AN*	*MH202A*							*0.0*	*286.9*	*3.47*	*3.23*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*1.66*	*0.55*	*0.00*	*0.00*	*3.77*	*40.68*	*21.00*	*250*	*0.43*	*0.803*	*36.91*	*90.72%*
Wigwas Street	MH315A	MH315A	MH314A	0.79	2	18				55.4	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.79	0.79	0.26	0.00	0.00	0.92	49.63	*111.64*	*250*	*0.64*	0.979	48.72	98.16%
Wigwas Street	MH314A	MH314A	BULK203AN	0.06						0.0	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.06	0.85	0.28	0.00	0.00	0.93	83.46	*14.37*	*250*	*1.81*	1.647	82.53	98.88%
Wigwas Street	-	*BULK203AN*	*MH203A*							*0.0*	*55.4*	*3.64*	*0.65*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.85*	*0.28*	*0.00*	*0.00*	*0.93*	*80.17*	*21.00*	*250*	*1.67*	*1.582*	*79.24*	*98.83%*
Moses Tennisco Street	MH313A	MH313A	MH312A	0.66	2	16				50.0	50.0	3.65	0.59	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.66	0.66	0.22	0.00	0.00	0.81	75.73	*77.20*	*250*	*1.49*	1.495	74.92	98.93%
Moses Tennisco Street	MH312A, PARK	MH312A	BULK204AN	0.21		2				5.4	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.87	0.29	0.00	0.00	0.94	94.29	*49.70*	*250*	*2.31*	1.861	93.35	99.00%
Park	PARK	MH350A	pipe	0.42						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.42	0.42	0.14	0.00	0.00	0.14	48.39	*11.00*	*200*	*2.00*	1.492	48.25	99.71%
Moses Tennisco Street	-	*BULK204AN*	*MH204A*							*0.0*	*55.4*	*3.64*	*0.65*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.87*	*0.29*	*0.00*	*0.00*	*0.94*	*89.90*	*21.00*	*250*	*2.10*	*1.774*	*88.96*	*98.95%*
Michael Stoqua Street	MH311A	MH311A	MH310A	0.44	1	9				27.7	27.7	3.69	0.33	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.44	0.44	0.15	0.00	0.00	0.48	72.35	77.82	250	1.36	1.428	71.87	99.34%
Michael Stoqua Street	MH310A	MH310A	BULK205AN	0.21		2				5.4	33.1	3.68	0.39	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.65	0.21	0.00	0.00	0.61	65.66	49.19	250	1.12	1.296	65.05	99.07%
Michael Stoqua Street	-	*BULK205AN*	*MH205A*							*0.0*	*33.1*	*3.68*	*0.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.65*	*0.21*	*0.00*	*0.00*	*0.61*	*66.24*	*21.00*	*250*	*1.14*	*1.307*	*65.63*	*99.08%*
Wanaki Road	MH200A	MH200A	MH318A							0.0	0.0	3.80	0.00	0.00	0.00	1.01	1.01	0.00	0.00	1.50	0.49	1.01	1.01	0.33	0.00	0.00	0.82	42.53	*63.35*	*250*	*0.47*	0.839	41.71	98.06%
Wanaki Road	MH318A	MH318A	MH300A							0.0	0.0	3.80	0.00	0.00	0.00	0.95	1.96	0.00	0.00	1.50	0.95	0.95	1.96	0.65	0.00	0.00	1.60	42.53	*77.11*	*250*	*0.47*	0.839	40.93	96.24%
Tawadina Road	MH300A	MH300A	MH301A	0.47		15				40.5	40.5	3.67	0.48	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.47	2.43	0.80	0.00	0.00	2.24	*31.02*	*109.85*	*250*	*0.25*	0.612	28.78	92.79%
Tawadina Road	MH301A	MH301A	MH302A	0.54		14				37.8	78.3	3.62	0.92	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.54	2.97	0.98	0.00	0.00	2.85	*59.18*	*110.39*	*250*	*0.91*	1.168	56.33	95.18%
Tawadina Road	MH302A	MH302A	MH303A	0.26		2				5.4	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.26	3.23	1.07	0.00	0.00	3.00	72.61	*111.69*	*250*	*1.37*	1.433	69.62	95.87%
Tawadina Road	MH303A	MH303A	MH304A	0.21						0.0	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.21	3.44	1.14	0.00	0.00	3.07	31.02	112.10	250	0.25	0.612	27.95	90.11%
Tawadina Road	MH305A	MH305A	MH304A	0.24						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.24	0.24	0.08	0.00	0.00	0.08	49.63	111.61	250	0.64	0.979	49.55	99.84%
																					0.00													
Bareille-Snow Street	EXT-1	BULK304AN	MH304A	7.35				905		1629.0	1629.0	3.12	16.49	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	7.35	7.35	2.43	0.00	0.00	18.91	31.02	20.00	250	0.25	0.612	12.11	39.04%
Bareille-Snow Street	MH304A-1, MH304A-2	MH304A	MH308A	1.47				190		342.0	2054.7	3.06	20.38	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	1.47	12.50	4.13	0.00	0.00	25.14	39.72	119.21	250	0.41	0.784	14.58	36.70%
Bareille-Snow Street	MH308A	MH308A	BULK206AN	0.07						0.0	2054.7	3.06	20.38	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.07	12.57	4.15	0.00	0.00	25.17	84.15	16.82	250	1.84	1.661	58.99	70.09%
Bareille-Snow Street		BULK206AN	MH206A							0.0	2054.7	3.06	20.38	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.00	12.57	4.15	0.00	0.00	25.17	88.83	21.00	250	2.05	1.753	63.66	71.67%
Codd's Road	MH340A	MH340A	BLK231AN	1.78				278		500.4	500.4	3.38	5.48	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.78	1.78	0.59	0.00	0.00	6.07	75.98	70.00	250	1.50	1.500	69.91	92.01%
Codd's Road		*MH231A*	*BULK176AN*							*0.0*	*500.4*	*3.38*	*5.48*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*1.78*	*0.59*	*0.00*	*0.00*	*6.07*	*83.92*	*50.22*	*250*	*1.83*	*1.656*	*77.86*	*92.77%*

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u	INST	28,000	L/Ha/day	
TH/F/SD	2.7	p/p/u	COM	28,000	L/Ha/day	
TH/S	2.3	p/p/u	IND	35,000	L/Ha/day	MOE Chart
APT	1.8	p/p/u		17000	L/Ha/day	
Other	60	p/p/Ha				

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,
   1.5 if greater than 20%, otherwise 1.0

Designed: KH

Checked: JIM

Dwg. Reference: 118863-400

No.	Revision	Date
1	Submission No. 1 for City Review	2018-12-20
2	Submission No. 2 for City Review	2019-03-15
3	MECP Submission	2019-04-17
4	Record information Added (No.1)	2020-10-08
5	Record information Added (No.2)	2021-03-23
6	Block 11 & 12 Study	2022-03-15

File Reference:	Date:	Sheet No:
118863.5.7.1	2021-03-31	1 of 1

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LEGEND
MH231A Existing infrastructure (shown for information only)
Block 11&12 Proposed Conditions

SANITARY SEWER DESIGN SHEET

Wateridge at Rockcliffe - Phase 2B
City of Ottawa
Canada Lands Company

LOCATION: STREET	LOCATION: AREA ID	LOCATION: FROM MH	LOCATION: TO MH	RESIDENTIAL: AREA w/ Units (Ha)	RESIDENTIAL: UNIT TYPES SF	UNIT TYPES SD / TH/F	UNIT TYPES TH/S	UNIT TYPES APT	AREA w/o Units (Ha)	POPULATION IND	POPULATION CUM	RES PEAK FACTOR	PEAK FLOW (L/s)	ICI AREAS: AREA (Ha) INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	ICI PEAK FACTOR	PEAK FLOW (L/s)	INFILTRATION ALLOWANCE: AREA (Ha) IND	AREA (Ha) CUM	FLOW (L/s)	FIXED FLOW (L/s) IND	FIXED FLOW (L/s) CUM	TOTAL FLOW (L/s)	PROPOSED SEWER DESIGN: CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY L/s	AVAILABLE CAPACITY (%)
Pimiwidon Street	MH317-1, MH317-2	MH317A	MH316A	1.50	1	104				284.2	284.2	3.47	3.20	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.50	1.50	0.50	0.00	0.00	3.69	40.68	83.00	250	0.43	0.803	36.99	90.93%
Pimiwidon Street	MH316A	MH316A	BULK202AN	0.16		1				2.7	286.9	3.47	3.23	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.16	1.66	0.55	0.00	0.00	3.77	37.74	43.10	250	0.37	0.745	33.96	90.00%
Pimiwidon Street	-	*BULK202AN*	*MH202A*							*0.0*	*286.9*	*3.47*	*3.23*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*1.66*	*0.55*	*0.00*	*0.00*	*3.77*	*40.68*	*21.00*	*250*	*0.43*	*0.803*	*36.91*	*90.72%*
Wigwas Street	MH315A	MH315A	MH314A	0.79	2	18				55.4	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.79	0.79	0.26	0.00	0.00	0.92	49.63	111.64	250	0.64	0.979	48.72	98.16%
Wigwas Street	MH314A	MH314A	BULK203AN	0.06						0.0	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.06	0.85	0.28	0.00	0.00	0.93	83.46	14.37	250	1.81	1.647	82.53	98.88%
Wigwas Street	-	*BULK203AN*	*MH203A*							*0.0*	*55.4*	*3.64*	*0.65*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.85*	*0.28*	*0.00*	*0.00*	*0.93*	*80.17*	*21.00*	*250*	*1.67*	*1.582*	*79.24*	*98.83%*
Moses Tennisco Street	MH313A	MH313A	MH312A	0.66	2	16				50.0	50.0	3.65	0.59	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.66	0.66	0.22	0.00	0.00	0.81	75.73	77.20	250	1.49	1.495	74.92	98.93%
Moses Tennisco Street	MH312A, PARK	MH312A	BULK204AN	0.21		2				5.4	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.87	0.29	0.00	0.00	0.94	94.29	49.70	250	2.31	1.861	93.35	99.00%
Park	PARK	MH350A	pipe	0.42						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.42	0.42	0.14	0.00	0.00	0.14	48.39	11.00	200	2.00	1.492	48.25	99.71%
Moses Tennisco Street	-	*BULK204AN*	*MH204A*							*0.0*	*55.4*	*3.64*	*0.65*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.87*	*0.29*	*0.00*	*0.00*	*0.94*	*89.90*	*21.00*	*250*	*2.10*	*1.774*	*88.96*	*98.95%*
Michael Stoqua Street	MH311A	MH311A	MH310A	0.44	1	9				27.7	27.7	3.69	0.33	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.44	0.44	0.15	0.00	0.00	0.48	72.35	77.82	250	1.36	1.428	71.87	99.34%
Michael Stoqua Street	MH310A	MH310A	BULK205AN	0.21		2				5.4	33.1	3.68	0.39	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.65	0.21	0.00	0.00	0.61	65.66	49.19	250	1.12	1.296	65.05	99.07%
Michael Stoqua Street	-	*BULK205AN*	*MH205A*							*0.0*	*33.1*	*3.68*	*0.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.65*	*0.21*	*0.00*	*0.00*	*0.61*	*66.24*	*21.00*	*250*	*1.14*	*1.307*	*65.63*	*99.08%*
Wanaki Road	MH200A	MH200A	MH318A							0.0	0.0	3.80	0.00	0.00	0.00	1.01	1.01	0.00	0.00	1.50	0.49	1.01	1.01	0.33	0.00	0.00	0.82	42.53	63.35	250	0.47	0.839	41.71	98.06%
Tawadina Road	MH300A	MH300A	MH301A	0.47		15				40.5	40.5	3.67	0.48	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.47	2.43	0.80	0.00	0.00	2.24	31.02	109.85	250	0.25	0.612	28.78	92.79%
Tawadina Road	MH301A	MH301A	MH302A	0.54		14				37.8	78.3	3.62	0.92	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.54	2.97	0.98	0.00	0.00	2.85	59.18	110.39	250	0.91	1.168	56.33	95.18%
Tawadina Road	MH302A	MH302A	MH303A	0.26		2				5.4	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.26	3.23	1.07	0.00	0.00	3.00	72.61	111.69	250	1.37	1.433	69.62	95.87%
Tawadina Road	MH303A	MH303A	MH304A	0.21						0.0	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.21	3.44	1.14	0.00	0.00	3.07	31.02	112.10	250	0.25	0.612	27.95	90.11%
Tawadina Road	MH305A	MH305A	MH304A	0.24						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.24	0.24	0.08	0.00	0.00	0.08	49.63	111.61	250	0.64	0.979	49.55	99.84%
																					0.00													
Bareille-Snow Street	EXT-1	BULK304AN	MH304A	7.35				905		1629.0	1629.0	3.12	16.49	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	7.35	7.35	2.43	0.00	0.00	18.91	31.02	20.00	250	0.25	0.612	12.11	39.04%
Bareille-Snow Street	MH304A-1, MH304A-2	MH304A	MH308A	1.48				140		252.0	1964.7	3.07	19.57	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	1.48	12.51	4.13	0.00	0.00	24.33	39.72	119.21	250	0.41	0.784	15.39	38.75%
Bareille-Snow Street	MH308A	MH308A	BULK206AN	0.96				352		633.6	2598.3	3.00	25.23	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.96	13.47	4.45	0.00	0.00	30.31	84.15	16.82	250	1.84	1.661	53.85	63.99%
Bareille-Snow Street		BULK206AN	MH206A							0.0	2598.3	3.00	25.23	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.00	13.47	4.45	0.00	0.00	30.31	88.83	21.00	250	2.05	1.753	58.52	65.88%
Codd's Road	MH340A	MH340A	BLK231AN	0.88				212		381.6	381.6	3.43	4.24	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.88	0.88	0.29	0.00	0.00	4.53	75.98	70.00	250	1.50	1.500	71.46	94.04%
Codd's Road		*MH231A*	*BULK176AN*							*0.0*	*381.6*	*3.43*	*4.24*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.88*	*0.29*	*0.00*	*0.00*	*4.53*	*83.92*	*50.22*	*250*	*1.83*	*1.656*	*79.40*	*94.61%*

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u	INST	28,000	L/Ha/day	
TH/F/SD	2.7	p/p/u	COM	28,000	L/Ha/day	
TH/S	2.3	p/p/u	IND	35,000	L/Ha/day	MOE Chart
APT	1.8	p/p/u		17000	L/Ha/day	
Other	60	p/p/Ha				

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,
   1.5 if greater than 20%, otherwise 1.0

Designed: KH

Checked: JIM

Dwg. Reference: 118863-400

No.	Revision	Date
1	Submission No. 1 for City Review	2018-12-20
2	Submission No. 2 for City Review	2019-03-15
3	MECP Submission	2019-04-17
4	Record information Added (No.1)	2020-10-08
5	Record information Added (No.2)	2021-03-23
6	Block 11 & 12 Study	2022-03-15

File Reference:	Date:	Sheet No:
118863.5.7.1	2021-03-31	1 of 1

APPENDIX B

- Sanitary Sewer Spreadsheet – Original Concept Site Plan
- Sanitary Sewer Spreadsheet – DesignWorks Engineering Site Plan

IBI GROUP
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Ottawa, Ontario K1S 5N4 Canada
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LEGEND
MH231A Existing infrastructure (shown for information only)
Block 11&12 Proposed Conditions

SANITARY SEWER DESIGN SHEET

Wateridge at Rockcliffe - Phase 2B
City of Ottawa
Canada Lands Company

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA w/ Units (Ha)	UNIT TYPES				AREA w/o Units (Ha)	POPULATION		RES PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)						ICI PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)		FLOW (L/s)			(L/s)	CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY	
														INSTITUTIONAL		COMMERCIAL		INDUSTRIAL																
STREET	AREA ID	FROM MH	TO MH		SF	SD / TH/F	TH/S	APT		IND	CUM			IND	CUM	IND	CUM	IND	CUM			IND	CUM		IND	CUM							L/s	(%)
Pimiwidon Street	MH317-1, MH317-2	MH317A	MH316A	1.50	1	104				284.2	284.2	3.47	3.20	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.50	1.50	0.50	0.00	0.00	3.69	40.68	83.00	250	0.43	0.803	36.99	90.93%
Pimiwidon Street	MH316A	MH316A	BULK202AN	0.16		1				2.7	286.9	3.47	3.23	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.16	1.66	0.55	0.00	0.00	3.77	37.74	43.10	250	0.37	0.745	33.96	90.00%
Pimiwidon Street	-	*BULK202AN*	*MH202A*							*0.0*	*286.9*	*3.47*	*3.23*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*1.66*	*0.55*	*0.00*	*0.00*	*3.77*	*40.68*	*21.00*	*250*	*0.43*	*0.803*	*36.91*	*90.72%*
Wigwas Street	MH315A	MH315A	MH314A	0.79	2	18				55.4	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.79	0.79	0.26	0.00	0.00	0.92	49.63	111.64	250	0.64	0.979	48.72	98.16%
Wigwas Street	MH314A	MH314A	BULK203AN	0.06						0.0	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.06	0.85	0.28	0.00	0.00	0.93	83.46	14.37	250	1.81	1.647	82.53	98.88%
Wigwas Street	-	*BULK203AN*	*MH203A*							*0.0*	*55.4*	*3.64*	*0.65*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.85*	*0.28*	*0.00*	*0.00*	*0.93*	*80.17*	*21.00*	*250*	*1.67*	*1.582*	*79.24*	*98.83%*
Moses Tennisco Street	MH313A	MH313A	MH312A	0.66	2	16				50.0	50.0	3.65	0.59	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.66	0.66	0.22	0.00	0.00	0.81	75.73	77.20	250	1.49	1.495	74.92	98.93%
Moses Tennisco Street	MH312A, PARK	MH312A	BULK204AN	0.21		2				5.4	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.87	0.29	0.00	0.00	0.94	94.29	49.70	250	2.31	1.861	93.35	99.00%
Park	PARK	MH350A	pipe	0.42						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.42	0.42	0.14	0.00	0.00	0.14	48.39	11.00	200	2.00	1.492	48.25	99.71%
Moses Tennisco Street	-	*BULK204AN*	*MH204A*							*0.0*	*55.4*	*3.64*	*0.65*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.87*	*0.29*	*0.00*	*0.00*	*0.94*	*89.90*	*21.00*	*250*	*2.10*	*1.774*	*88.96*	*98.95%*
Michael Stoqua Street	MH311A	MH311A	MH310A	0.44	1	9				27.7	27.7	3.69	0.33	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.44	0.44	0.15	0.00	0.00	0.48	72.35	77.82	250	1.36	1.428	71.87	99.34%
Michael Stoqua Street	MH310A	MH310A	BULK205AN	0.21		2				5.4	33.1	3.68	0.39	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.65	0.21	0.00	0.00	0.61	65.66	49.19	250	1.12	1.296	65.05	99.07%
Michael Stoqua Street	-	*BULK205AN*	*MH205A*							*0.0*	*33.1*	*3.68*	*0.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.65*	*0.21*	*0.00*	*0.00*	*0.61*	*66.24*	*21.00*	*250*	*1.14*	*1.307*	*65.63*	*99.08%*
Wanaki Road	MH200A	MH200A	MH318A							0.0	0.0	3.80	0.00	0.00	0.00	1.01	1.01	0.00	0.00	1.50	0.49	1.01	1.01	0.33	0.00	0.00	0.82	42.53	63.35	250	0.47	0.839	41.71	98.06%
Tawadina Road	MH300A	MH300A	MH301A	0.47		15				40.5	40.5	3.67	0.48	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.47	2.43	0.80	0.00	0.00	2.24	31.02	109.85	250	0.25	0.612	28.78	92.79%
Tawadina Road	MH301A	MH301A	MH302A	0.54		14				37.8	78.3	3.62	0.92	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.54	2.97	0.98	0.00	0.00	2.85	59.18	110.39	250	0.91	1.168	56.33	95.18%
Tawadina Road	MH302A	MH302A	MH303A	0.26		2				5.4	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.26	3.23	1.07	0.00	0.00	3.00	72.61	111.69	250	1.37	1.433	69.62	95.87%
Tawadina Road	MH303A	MH303A	MH304A	0.21						0.0	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.21	3.44	1.14	0.00	0.00	3.07	31.02	112.10	250	0.25	0.612	27.95	90.11%
Tawadina Road	MH305A	MH305A	MH304A	0.24						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.24	0.24	0.08	0.00	0.00	0.08	49.63	111.61	250	0.64	0.979	49.55	99.84%
																					0.00													
Bareille-Snow Street	EXT-1	BULK304AN	MH304A	7.35				905		1629.0	1629.0	3.12	16.49	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	7.35	7.35	2.43	0.00	0.00	18.91	31.02	20.00	250	0.25	0.612	12.11	39.04%
Bareille-Snow Street	MH304A-1, MH304A-2	MH304A	MH308A	1.48				140		252.0	1964.7	3.07	19.57	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	1.48	12.51	4.13	0.00	0.00	24.33	39.72	119.21	250	0.41	0.784	15.39	38.75%
Bareille-Snow Street	MH308A	MH308A	BULK206AN	0.96				352		633.6	2598.3	3.00	25.23	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.96	13.47	4.45	0.00	0.00	30.31	84.15	16.82	250	1.84	1.661	53.85	63.99%
Bareille-Snow Street		BULK206AN	MH206A							0.0	2598.3	3.00	25.23	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.00	13.47	4.45	0.00	0.00	30.31	88.83	21.00	250	2.05	1.753	58.52	65.88%
Codd's Road	MH340A	MH340A	BLK231AN	0.88				212		381.6	381.6	3.43	4.24	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.88	0.88	0.29	0.00	0.00	4.53	75.98	70.00	250	1.50	1.500	71.46	94.04%
Codd's Road		*MH231A*	*BULK176AN*							*0.0*	*381.6*	*3.43*	*4.24*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.88*	*0.29*	*0.00*	*0.00*	*4.53*	*83.92*	*50.22*	*250*	*1.83*	*1.656*	*79.40*	*94.61%*

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u	INST	28,000	L/Ha/day	
TH/F/SD	2.7	p/p/u	COM	28,000	L/Ha/day	
TH/S	2.3	p/p/u	IND	35,000	L/Ha/day	MOE Chart
APT	1.8	p/p/u		17000	L/Ha/day	
Other	60	p/p/Ha				

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,
   1.5 if greater than 20%, otherwise 1.0

Designed: KH

Checked: JIM

Dwg. Reference: 118863-400

No.	Revision	Date
1	Submission No. 1 for City Review	2018-12-20
2	Submission No. 2 for City Review	2019-03-15
3	MECP Submission	2019-04-17
4	Record information Added (No.1)	2020-10-08
5	Record information Added (No.2)	2021-03-23
6	Block 11 & 12 Study	2022-03-15

File Reference:	Date:	Sheet No:
118863.5.7.1	2021-03-31	1 of 1

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

LEGEND

MH231A	Existing infrastructure (shown for information only)
(yellow)	Block 11 Proposed Conditions (DesignWorks Engineering)

SANITARY SEWER DESIGN SHEET

Wateridge at Rockcliffe - Phase 2B
City of Ottawa
Canada Lands Company

LOCATION: STREET	LOCATION: AREA ID	FROM MH	TO MH	RESIDENTIAL: AREA w/ Units (Ha)	UNIT TYPES: SF	SD / TH/F	TH/S	APT	AREA w/o Units (Ha)	POPULATION: IND	POPULATION: CUM	RES PEAK FACTOR	PEAK FLOW (L/s)	ICI AREAS (Ha): INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	ICI PEAK FACTOR	PEAK FLOW (L/s)	INFILTRATION ALLOWANCE: AREA (Ha) IND	AREA (Ha) CUM	FLOW (L/s)	FIXED FLOW (L/s): IND	FIXED FLOW: CUM	TOTAL FLOW (L/s)	PROPOSED SEWER DESIGN: CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY L/s	AVAILABLE CAPACITY (%)
Tawadina Road	MH300A	MH300A	MH301A	0.47		15				40.5	40.5	3.67	0.48	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.47	2.43	0.80	0.00	0.00	2.24	*31.02*	*109.85*	*250*	*0.25*	0.612	28.78	92.79%
Tawadina Road	MH301A	MH301A	MH302A	0.54		14				37.8	78.3	3.62	0.92	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.54	2.97	0.98	0.00	0.00	2.85	*59.18*	*110.39*	*250*	*0.91*	1.168	56.33	95.18%
Tawadina Road	MH302A	MH302A	MH303A	0.26		2				5.4	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.26	3.23	1.07	0.00	0.00	3.00	*72.61*	*111.69*	*250*	*1.37*	1.433	69.62	95.87%
Tawadina Road	MH303A	MH303A	MH304A	0.93				240		432.0	515.7	3.37	5.64	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.93	4.16	1.37	0.00	0.00	7.96	31.02	112.10	250	0.25	0.612	23.06	74.33%
Tawadina Road	MH305A	MH305A	MH304A	0.24						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.24	0.24	0.08	0.00	0.00	0.08	49.63	111.61	250	0.64	0.979	49.55	99.84%
																					0.00													
Bareille-Snow Street	EXT-1	BULK304AN	MH304A	7.35				905		1629.0	1629.0	3.12	16.49	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	7.35	7.35	2.43	0.00	0.00	18.91	31.02	20.00	250	0.25	0.612	12.11	39.04%
Bareille-Snow Street	MH304A-1, MH304A-2	MH304A	MH308A	0.76				52		93.6	2238.3	3.04	22.04	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.76	12.51	4.13	0.00	0.00	26.80	39.72	119.21	250	0.41	0.784	12.93	32.54%
Bareille-Snow Street	MH308A	MH308A	BULK206AN	0.96				352		633.6	2871.9	2.97	27.61	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.96	13.47	4.45	0.00	0.00	32.69	84.15	16.82	250	1.84	1.661	51.46	61.15%
Bareille-Snow Street		BULK206AN	MH206A							0.0	2871.9	2.97	27.61	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.00	13.47	4.45	0.00	0.00	32.69	88.83	21.00	250	2.05	1.753	56.13	63.20%
Codd's Road	MH340A	MH340A	BLK231AN	0.88				212		381.6	381.6	3.43	4.24	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.88	0.88	0.29	0.00	0.00	4.53	75.98	70.00	250	1.50	1.500	71.46	94.04%
Codd's Road		*MH231A*	*BULK176AN*							*0.0*	*381.6*	*3.43*	*4.24*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.88*	*0.29*	*0.00*	*0.00*	*4.53*	*83.92*	*50.22*	*250*	*1.83*	*1.656*	*79.40*	*94.61%*

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u	INST	28,000	L/Ha/day	
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TH/S	2.3	p/p/u				
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,
   1.5 if greater than 20%, otherwise 1.0

Designed: KH

Checked: JIM

Dwg. Reference: 118863-400

No.	Revision	Date
1	Submission No. 1 for City Review	2018-12-20
2	Submission No. 2 for City Review	2019-03-15
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4	Record information Added (No.1)	2020-10-08
5	Record information Added (No.2)	2021-03-23

File Reference:	Date:	Sheet No:
118863.5.7.1	2021-03-31	1 of 1

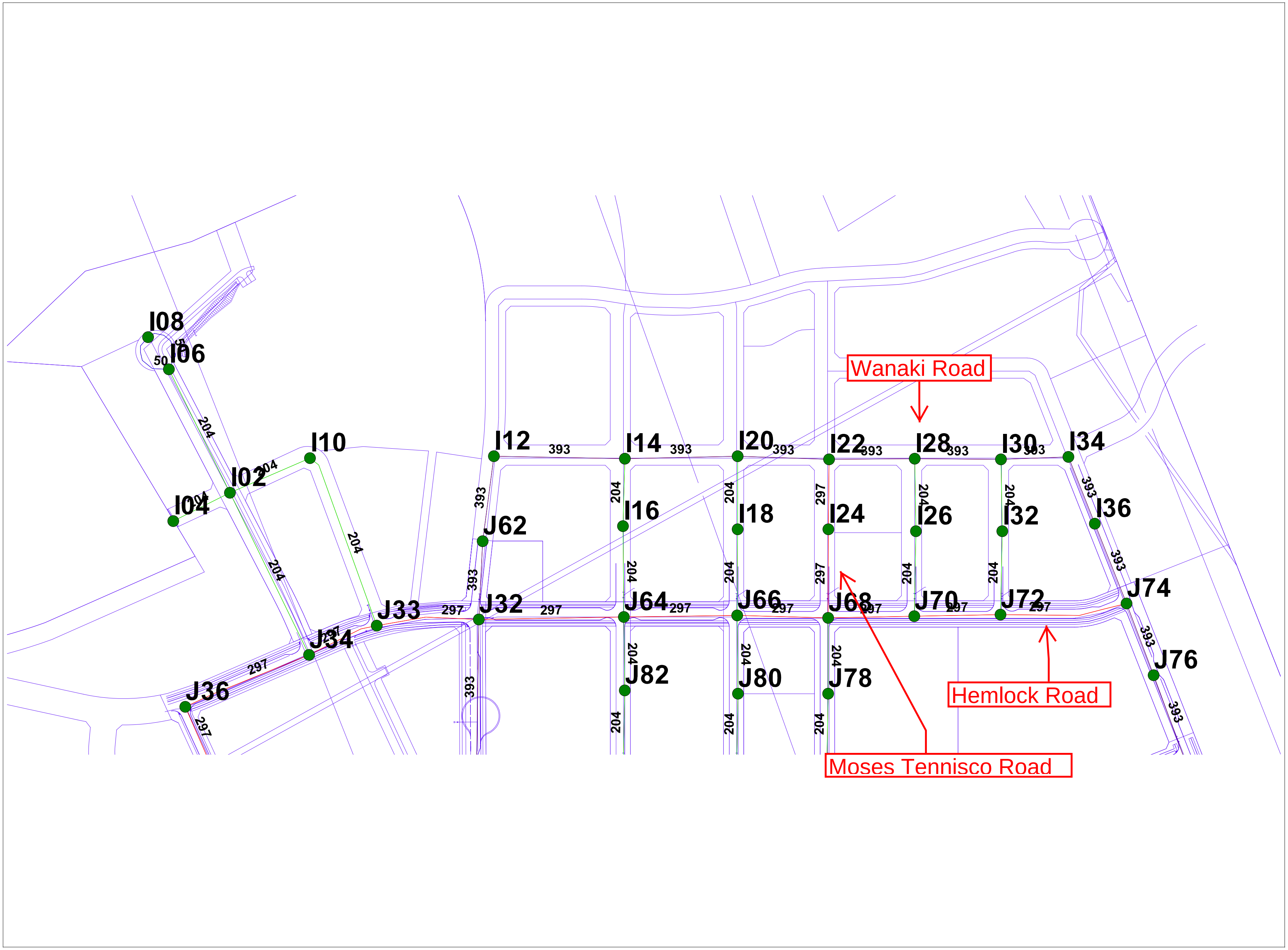
APPENDIX C

- Water Modeling Results – Phase 2B Design Brief

Wateridge Overall Model

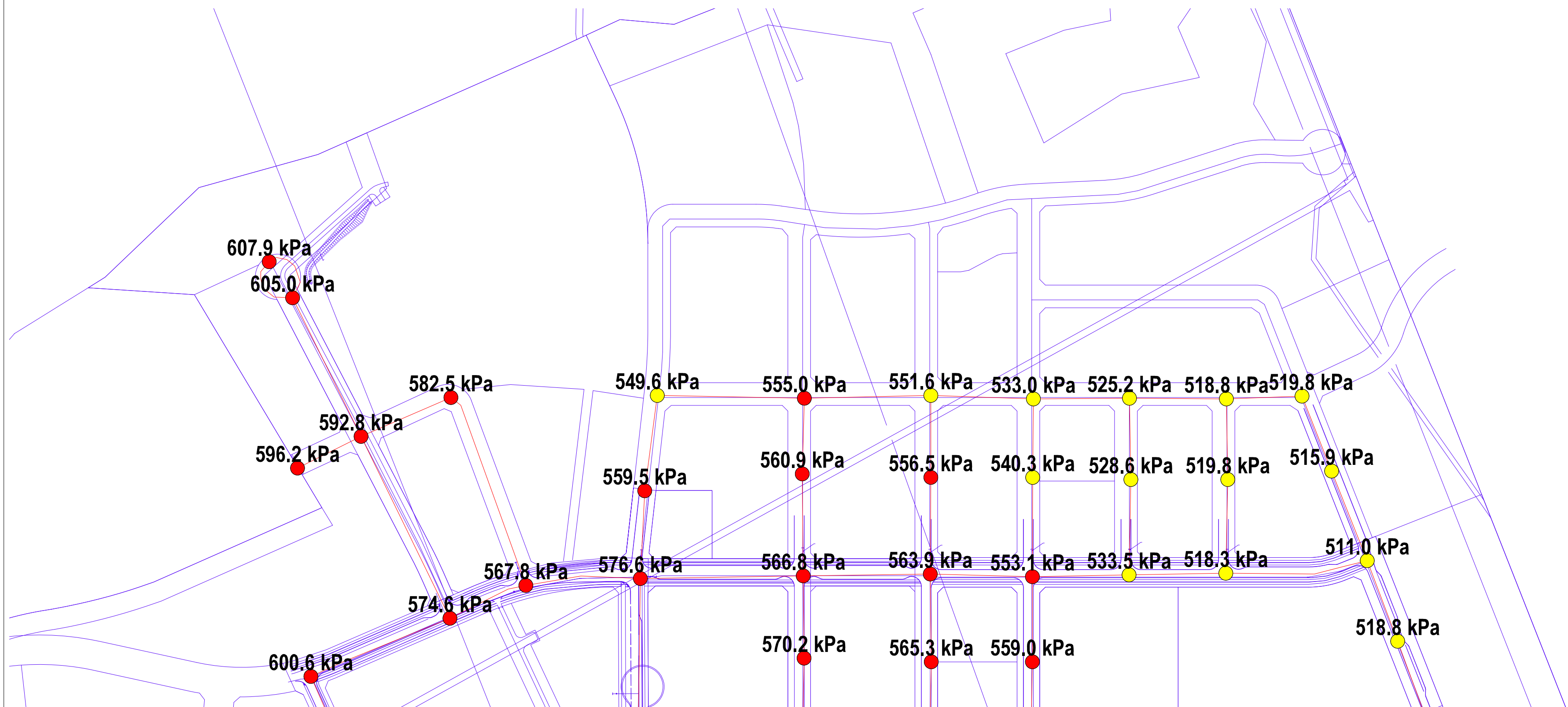
Date: Thursday, December 06, 2018

Phase 2 Node ID's and Pipe Sizes



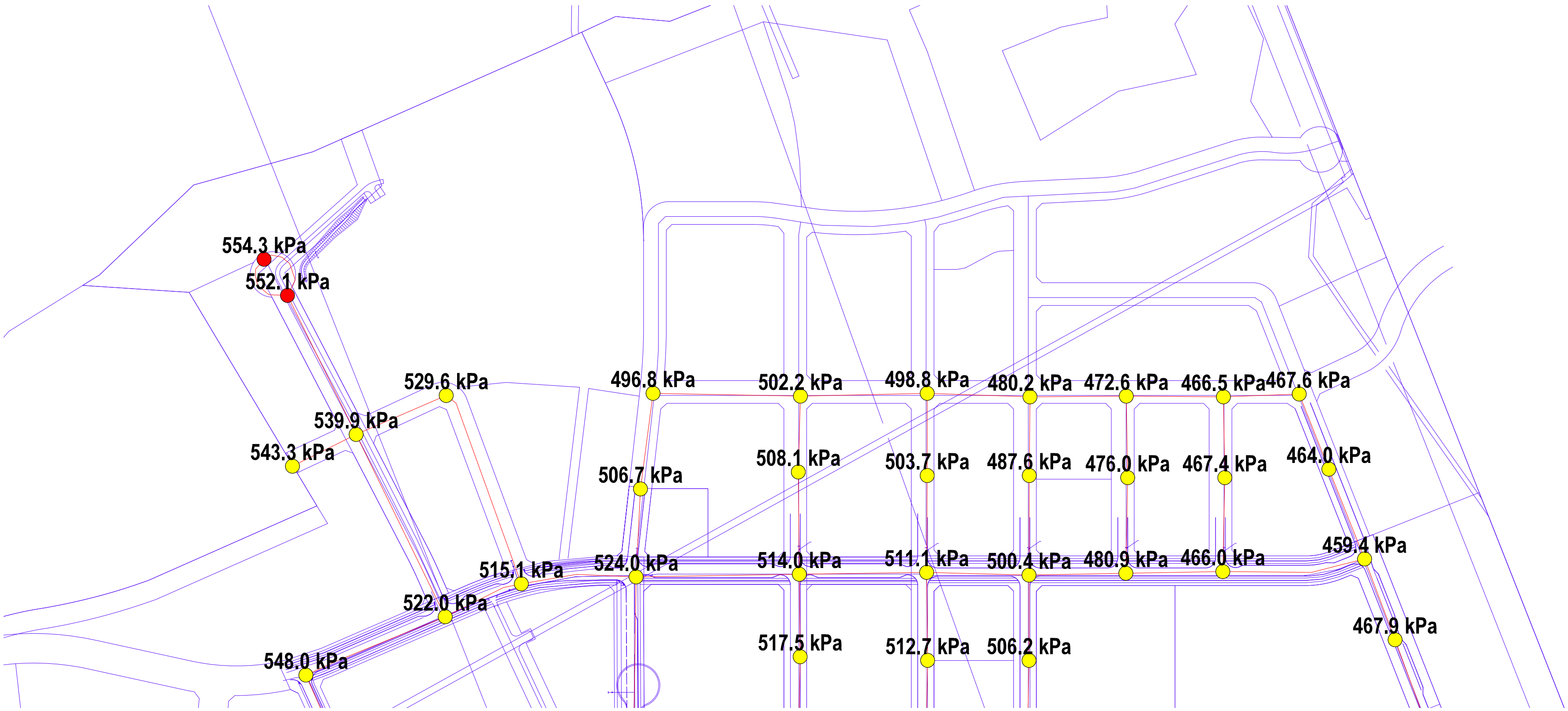
Date: Thursday, December 06, 2018

Phase 2 Basic Day (Max HGL) Pressures



Date: Thursday, December 06, 2018

Phase 2 Peak Hour Pressures



Date: Thursday, December 06, 2018

Phase 2 Max Day + Fire Design Fireflows

Date: Thursday, December 06, 2018

APPENDIX D

- Low Impact Development (LID) Review

To: **Anton Chetrar & Jim Moffatt**
IBI
400-333 Preston Street, Ottawa, ON K1S 5N4

Krisendat Sewgoolam & Mary Jarvis
Canada Lands Corporation (CLC)
30 Metcalfe Street, Suite 601, Ottawa, Ontario, K1P 5L4

From: **Chris Denich, M.Sc. P.Eng., Aquafor Beech Ltd.**
55 Regal Road, Guelph, ON, N1K 1B6

Re: **Submission 1: Site Plan Package Submission to Canada Lands Company; 1050 Tawadina Road, Ottawa**

At the request of CLC, we have completed a review of submission 1 for 1050 Tawadina Road, Ottawa (Block 11) in regards to the Low Impact Development (LID) requirements. The review has been based on the designs as detailed in the relevant reports and site drawings prepared by Westurban Developments and offer the following advisory comments, without prejudice. The following documents, reports and drawings were reviewed:

1. Wateridge Village Municipal Servicing and Stormwater Management Feasibility Study Report (October 21, 2022) – Prepared by Design Works Engineering Ltd.;
2. Civil Drawings (Issued for CLC Submission) – October 25, 2022 – Prepared by Design Works Engineering Ltd:
    a. Site Grading Plan;
    b. Site Servicing Plan;
    c. Site Erosion and Sediment Control Plan;
    d. Utility Plan;
3. Geotechnical Investigation – Proposed Two New Apartments Buildings 1050 Tawadina Road, Ottawa, ON (November 3, 2022) – Prepared by Englobe.
4. Architectural Drawings (undated) – Prepared By Formed Alliance Architects Studio (FAAS)
5. Landscape Drawings (October 24, 3022) – Prepared by CSW

General Comments

1. In regards to submission 1, it is noted that CLC`s goal for this overall development is for the Wateridge Village development (Former CFB Rockcliffe) to be a model community for LID. In general, the proposed design is not in keeping with CLC's design vision nor the LID Demonstration Project goals and objectives, including overall aesthetic enhancement and synergies using LIDs. The current site plan does not demonstrate LID technologies to the full extent.

2. It is acknowledged that per Section 5.3 Wateridge Village Municipal Servicing and Stormwater Management Feasibility Study Report that reference has been appropriately made to Wateridge Phase 2B LID Developer's Checklist, which was include as Appendix D. It is further noted that notwithstanding the comments below, the design calculations demonstrates that proposed LID achieves the required 4mm LID Infiltration target and 4mm LID Erosion Target, but does not achieve the required Minimum Water Quality Target of the 15mm event as specified in Table 2.1.

3. It is acknowledged that a series two (2) Soleno Underground Infiltration Systems (Solo Max Perforated Subdrain) been included with the intent of infiltrating runoff from the respective roof drainage area. The following is noted:
    a. Sufficient design details have not been provided for the proposed Underground Infiltration Systems. No design details and/or cross-sections are provided within the civil drawings and no product specifications/ technical documents. Trench widths, bedding materials, filter fabrics, founding elevations, backfill and compaction requirements etc. should be detailed.
    b. Per the TRCA/CVC LID Planning and Design Guide (2010), Wiki Document (wiki.sustainabletechnologies.ca) or most current, infiltration galleries (soakaways, trenches and chambers), should be set back at least four (4) metres from building foundations (specifically where liveable spaces, mechanical rooms, parking or other are located sub-surface) unless infiltration facility inverts are located below the lowest finished floor elevation. As such the following is recommended:
        i. Show offset from the respective Building A proximal to the infiltration gallery and increase to 4m if feasible.
        ii. Please confirm if the infiltration system inverts are located below the lowest finished floor elevation of Building A proximal to the infiltration system.
        iii. If 4m cannot be accommodated or infiltration systems cannot be located below the lowest finished floor elevation, it is recommended that inclusion of impermeable barriers proximal to the building side of the infiltration system or additional building waterproofing be included.
    c. It is understood that the infiltration systems will accept roof runoff. Pre-treatment devises (leaf screens and/or filters) are recommended to prevent debris from entering the infiltration systems.
    d. The Wateridge Village Municipal Servicing and Stormwater Management Feasibility Study Report should include a discussion of winter operation/ functionality of the infiltration systems
    e. Per the TRCA/CVC LID Planning and Design Guide (2010), Wiki Document (wiki.sustainabletechnologies.ca) or most current, please confirm that the impervious drainage area to the areas of each infiltration systems is between 5:1 and 20:1.
    f. LID specific Erosion and Sediment Controls and Construction Staging for Section 5.21 of the Stormwater Management Existing Conditions Report & LID Pilot Project Scoping (Aquafor Beech (2015) have not been provided. LID controls that rely on infiltration require specific ESC controls to be in place during construction to prevent contamination/ clogging during construction.
    g. LID designs should reference the requirements of the City of Ottawa, Low Impact Development Technical Guidance Report – Implementation in Areas with Potential Hydrogeological Constraints (February 2021) for design, analysis and in-situ testing requirements.

4. No discussion or details are provided with the Wateridge Village Municipal Servicing and Stormwater Management Feasibility Study Report or the Geotechnical Investigation in regards to the site context as it relates to the Underground Infiltration Systems specifically:
    a. In-situ Infiltration rates of the native soils within the proposed footprint of the Underground Infiltration Systems
    b. the seasonally high groundwater elevation,

c. bedrock elevation, and
d. the soil stratigraphy that proposed Underground Infiltration Systems would be founded

5. As an advisory comment, opportunities for additional LID integration into the site include but are not limited to:
   a. Raised planter areas: opportunity to design as bioretention planters
   b. Tree plantings: opportunity to design tree pits or cluster plantings
   c. Area drains: opportunity to design as bioretention areas
   d. Unit paver areas: opportunity to design as permeable pavements

The above noted comments should be considered preliminary in nature and limited to the information provided. Additional information shall be required prior to Aquafor Beech completing a thorough and complete review.

August 17, 2023

Cameron Salisbury, MEDes., RPP., MCIP
Directory of Development
WestUrban Developments Ltd.
111-2036 Island Highway South
Campbell River, BC
V9W 0E8

Re: Permeability Testing and Monitoring Well Installations – 1050 Tawadina Road, Ottawa

McIntosh Perry ('MP') was retained by Cameron Salisbury of WestUrbanDevelopments Ltd. ('Client') to conduct permeability investigations within an undeveloped parcel of land located at 1050 Tawadina Road in Ottawa, Ontario ('the Site'). The scope of work included the completion of in-situ permeability testing at two locations in the northwest and southeast corner of the Site, at varying depths (0.5, 1.0., and 1.5 m below ground surface (bgs)). Additionally, McIntosh Perry advanced two boreholes equipped with monitoring wells within these same areas.

Permeability Testing – Infiltration Values

McIntosh Perry completed permeability testing in the northwest and southeast corners of the Site at 0.5, 1.0., and 1.5 m bgs. To complete these tests, MP utilized a Guelph Permeameter (a constant head permeameter used to measure in-situ saturated hydraulic conductivities of soil). Holes were dug using either a hand auger or mechanized equipment (backhoe). A total of six (6) holes/test pits were advanced, three (3) within the northwest portion of the Site (Hole 1A, TP1, and TP2), and three (3) within the southeast portion of the Site (TP3, TP4, and TP5). The locations of these holes are indicated on Figure 1 below. This work was completed on July 17, 2023 (Hole 1A) and August 2, 2023 (TP1, TP2, TP3, TP4, TP5).

Figure 1. Infiltration Testing and Monitoring Well Locations

Each infiltration test consisted of a 5-15 cm head test, based on the level of saturation and subsurface materials encountered where testing was attempted. Water was added to the Guelph Permeameter reservoir and allowed to infiltrate into the soil at the specified head pressure. Changes in reservoir water level (h) were recorded at regular intervals and normalized for change in time (t). each test was considered complete when dh/dt (change in head/change in time) reached a steady-state for at least three consecutive measurements.

Appendix C.2 of the Toronto Region Conservation Authority's (TRCA) Stormwater Management Criteria (August 2012) provides guidance on the calculation of infiltration rates using field saturated hydraulic conductivity (K_{fs}). The recommended calculation is as follows:

$$K_{fs} = (6 \times 10^{-11}) (I^{3.7363})$$

Where:

- K_{fs} is the field saturated hydraulic conductivity (in cm/s), as measured by a Guelph Permeameter, double-ring infiltrometer, single-ring infiltrometer, or other accepted method
- I is the infiltration rate (in mm/hr)

Based on the above calculation, the estimated soil infiltration rate (I) from the data collected at all locations is shown in the table below.

Table 1: Infiltration Rates

Borehole ID	K_{fs} cm/s	Infiltration Rate (mm/hour)	Corrected I* (mm/hr)	Subsurface Materials	Depth of Hole (m bgs)
Hole 1A	4.07×10^{-8}	5.7	1.64	Clay	0.5
TP1	2.80×10^{-6}	17.7	5.08	Silty sand	1.0
TP2	1.48×10^{-6}	14.9	4.28	Silty sand	1.5
TP3	2.95×10^{-6}	18.02	5.15	Medium to fine-grained sand	0.5
TP4	2.34×10^{-6}	16.9	4.84	Silty sand	1.0
TP5	1.32×10^{-6}	14.5	4.15	Fine-grained sand with silt and clay	1.5

* Includes a safety factor calculated per TRCA guidance. Safety factors are chosen based on the ratio of highest to lowest permeability rates measured at the same test location, within unique strata.

As shown, the highest infiltration rate was observed in TP5 at a depth of approximately 1.5 m bgs. The lowest infiltration rate was observed in Hole 1A at a depth of approximately 0.5 m bgs. These values are generally consistent with the observed stratigraphy, in that fine-grain materials will typically have lower hydraulic conductivity rates.

Monitoring Well Installations

McIntosh Perry installed two (2) boreholes (equipped with monitoring wells) on August 4, 2023. Boreholes were advanced by Strata Drilling under the supervision of McIntosh Perry personnel. One borehole was installed within overburden materials at bedrock refusal (1.9 m bgs), and one was drilled through bedrock materials until interception with groundwater occurred (8.3 m bgs). In addition, groundwater level measurements were obtained from each monitoring well after installation (approximately 10-15 after installation).

Monitoring well BH23-1 (MW) was installed within the southeast portion of the Site to a final depth of 1.9 m bgs. Monitoring well BH23-2 (MW) was installed within the northwest portion of the Site, to a final depth of 8.3 m bgs. Based on test pits dug as part of the infiltration testing, overburden encountered within the area of BH23-1 (MW) and BH23-2 (MW) included cobbles/debris followed by silty sand with trace gravel and clay until refusal on bedrock. Bedrock was encountered at 2 m bgs at BH23-2 (MW), after which time Strata employed the use of an air hammer to advance the borehole to a final depth of 8.3 m bgs. Groundwater was encountered in bedrock between 6-7 m bgs.

The newly installed monitoring wells were constructed using 2” (51 mm) Schedule 40 polyvinyl chloride (PVC) well screen (10 slot), flush-threaded to Schedule 40 PVC riser pipe. A silica sand filter pack was installed from the base of each well screen to 0.3 m above the top of the screen. A bentonite clay seal was installed above the silica sand filter pack to prevent infiltration of surface water into the groundwater monitoring well. The screened interval was positioned to intersect the water table.

Water Level Measurements

Water levels were measured immediately after the installation of both wells, on August 4, 2023. No groundwater was observed in BH23-1 (MW). Details of groundwater level measurements are described below:

Monitoring Well	Water Level (m bgs)	Well Depth (m bgs)
BH23-1 (MW)	(no water observed)	1.9 (overburden)
BH23-2 (MW)	5.9	8.3 (bedrock)

It should be noted that the above water levels may not be representative of long-term, stabilized groundwater table. Part of the rationale for installing the monitoring wells is to partially provide infrastructure for future measurements of the groundwater table.

We trust that this information is satisfactory for your present requirements. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Respectfully submitted,

McIntosh Perry Consulting Engineers Ltd.

Rebecca Leduc, M.Sc.
Environmental Scientist
r.leduc@mcintoshperry.com
Office: 343-764-2080

Jordan Bowman, P.Geo., P.Biol. (AB)
Manager, Geo-Environmental
j.bowman@mcintoshperry.com
Office: 613-714-4602

Servicing study guidelines for development applications

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☒ Date and revision number of the report.
- ☒ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☒ Plan showing the site and location of all existing services.
- ☐ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- ☒ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☒ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.
- ☒ Statement of objectives and servicing criteria.
- ☒ Identification of existing and proposed infrastructure available in the immediate area.
- ☒ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- ☒ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- ☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

☒ All preliminary and formal site plan submissions should have the following information:
- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

☒ Confirm consistency with Master Servicing Study, if available

☒ Availability of public infrastructure to service proposed development

☒ Identification of system constraints

☐ Identify boundary conditions

☒ Confirmation of adequate domestic supply and pressure

☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.

☒ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.

☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design

☒ Address reliability requirements such as appropriate location of shut-off valves

☐ Check on the necessity of a pressure zone boundary modification.

☒ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

- ☒ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- ☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- ☐ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- ☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- ☒ Confirm consistency with Master Servicing Study and/or justifications for deviations.
- ☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- ☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☒ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- ☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.
- ☒ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- ☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☐ Analysis of available capacity in existing public infrastructure.
- ☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- ☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- ☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- ☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ☐ Set-back from private sewage disposal systems.
- ☐ Watercourse and hazard lands setbacks.
- ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- ☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- ☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- ☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☒ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- ☐ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- ☐ Identification of potential impacts to receiving watercourses
- ☐ Identification of municipal drains and related approval requirements.
- ☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☒ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- ☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.
- ☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- ☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- ☐ Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

- ☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.
- ☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- ☐ Changes to Municipal Drains.
- ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- ☒ Clearly stated conclusions and recommendations
- ☒ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.
- ☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

APPENDIX B

Water Model Results
Water Demand Calculations
Fire flow Calculations
Architectural Building Areas

Chetrar, Anton

From:	Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Sent:	Wednesday, November 8, 2023 1:42 PM
To:	Chetrar, Anton
Subject:	RE: 1050 Tawadina Road - Water Boundary Conditions
Attachments:	1050 Tawadina Road Oct 2023.pdf
Follow Up Flag:	Follow up
Flag Status:	Flagged

Hello Anton

The following are boundary conditions, HGL, for hydraulic analysis for 1050 Tawadina Road (zone MONT), assumed to be connected to the 406 mm watermain on Tawadina Road and the 203 mm on Michael Stoqua Street (see attached PDF for location).

Min HGL: 143.0 m

Max HGL: 143.0 m

Max Day + Fire Flow (166.7 L/s): 140.5 m (Connection 1) and 137.2 m (Connection 2)

Max Day + Fire Flow (183.3 L/s): 141.7 m (Connection 1) and 137.9 m (Connection 2)

Note: A Second pump turns ON at Montreal pump station for the higher fire demand of 183.3 L/s

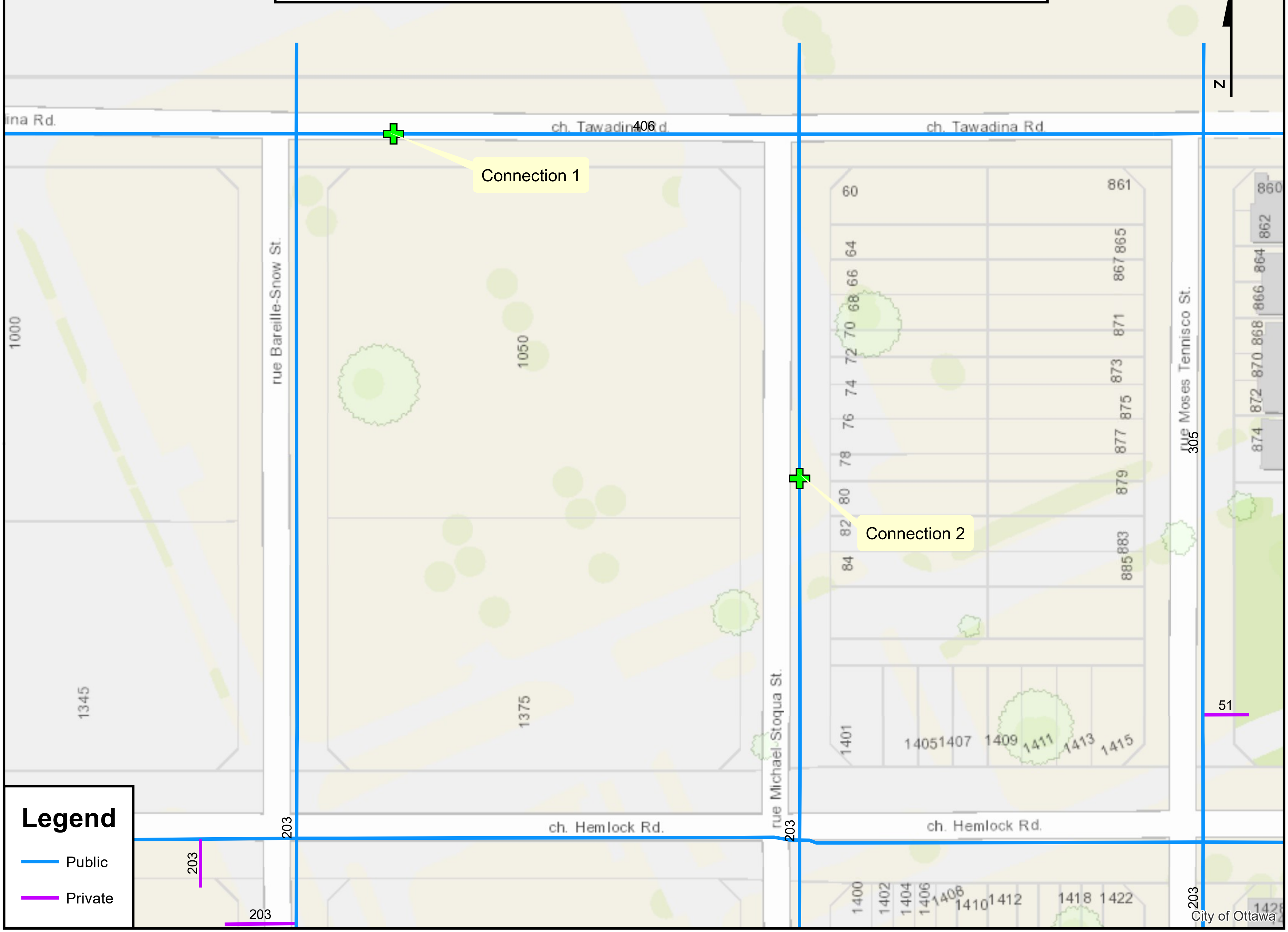
These are for current conditions and are based on computer model simulation.

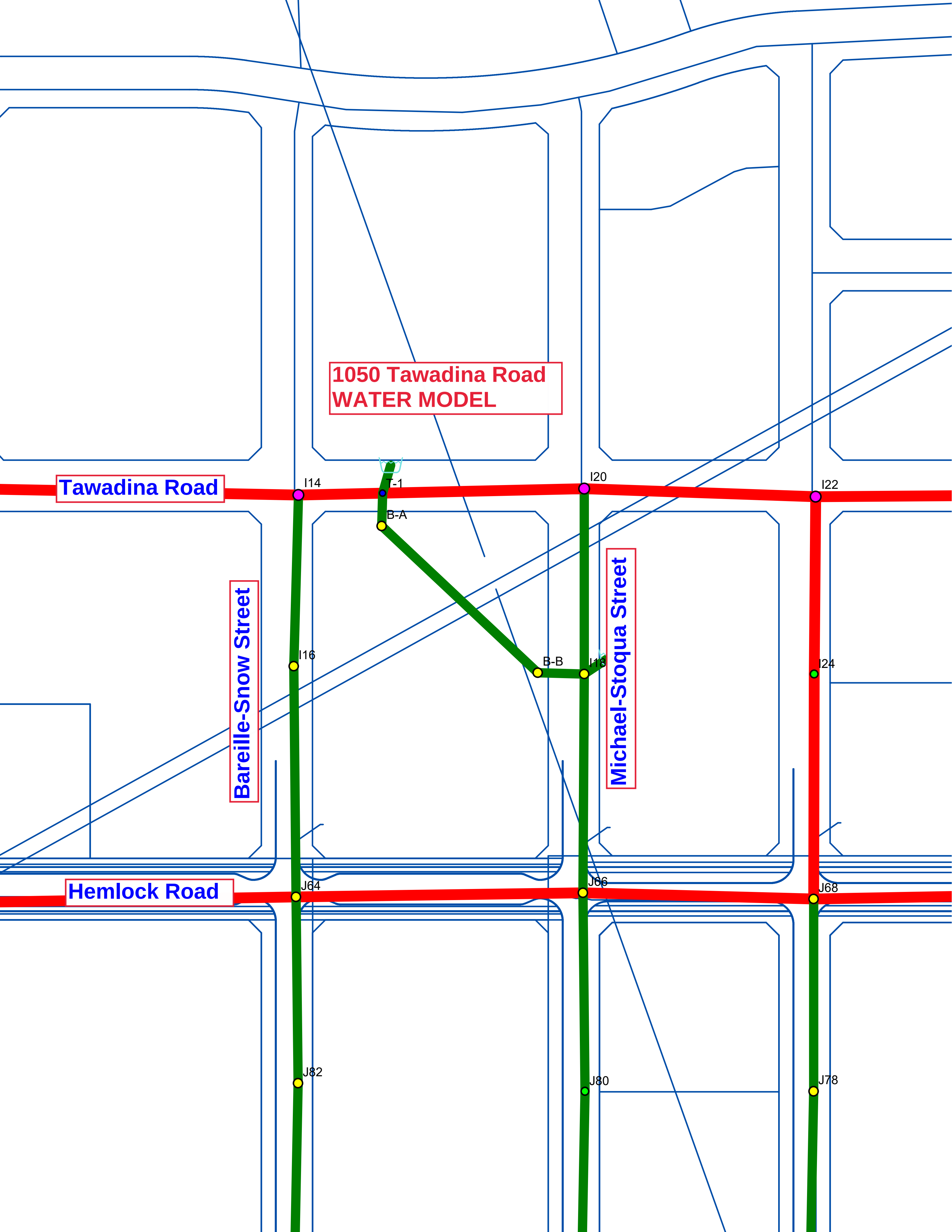
Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Thanks

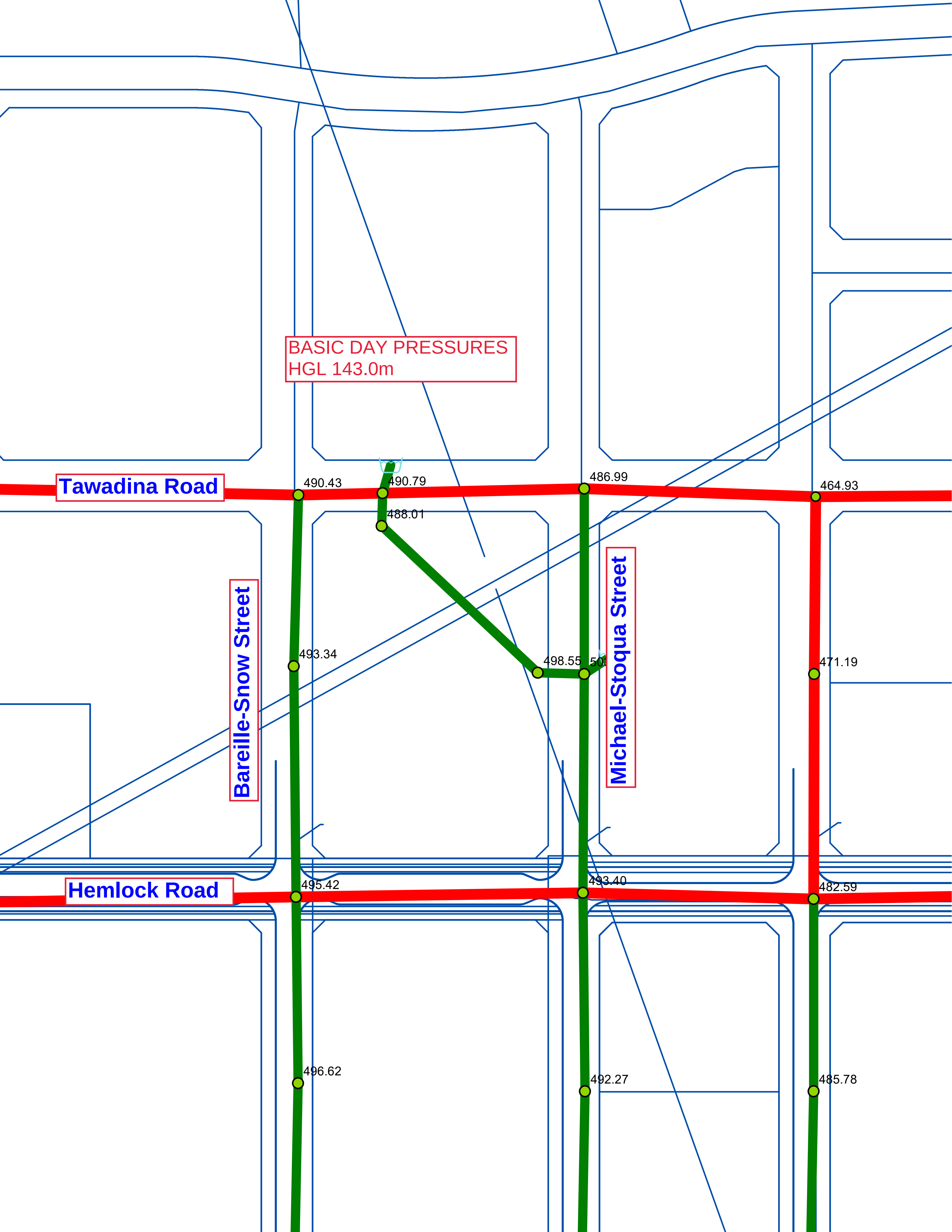
Nishant Jhamb, P.Eng
Project Manager |Gestionnaire de projet
Planning, Real Estate and Economic Development Department
Development Review - Central Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 23112, nishant.jhamb@ottawa.ca

Boundary Conditions for 1050 Tawadina Road





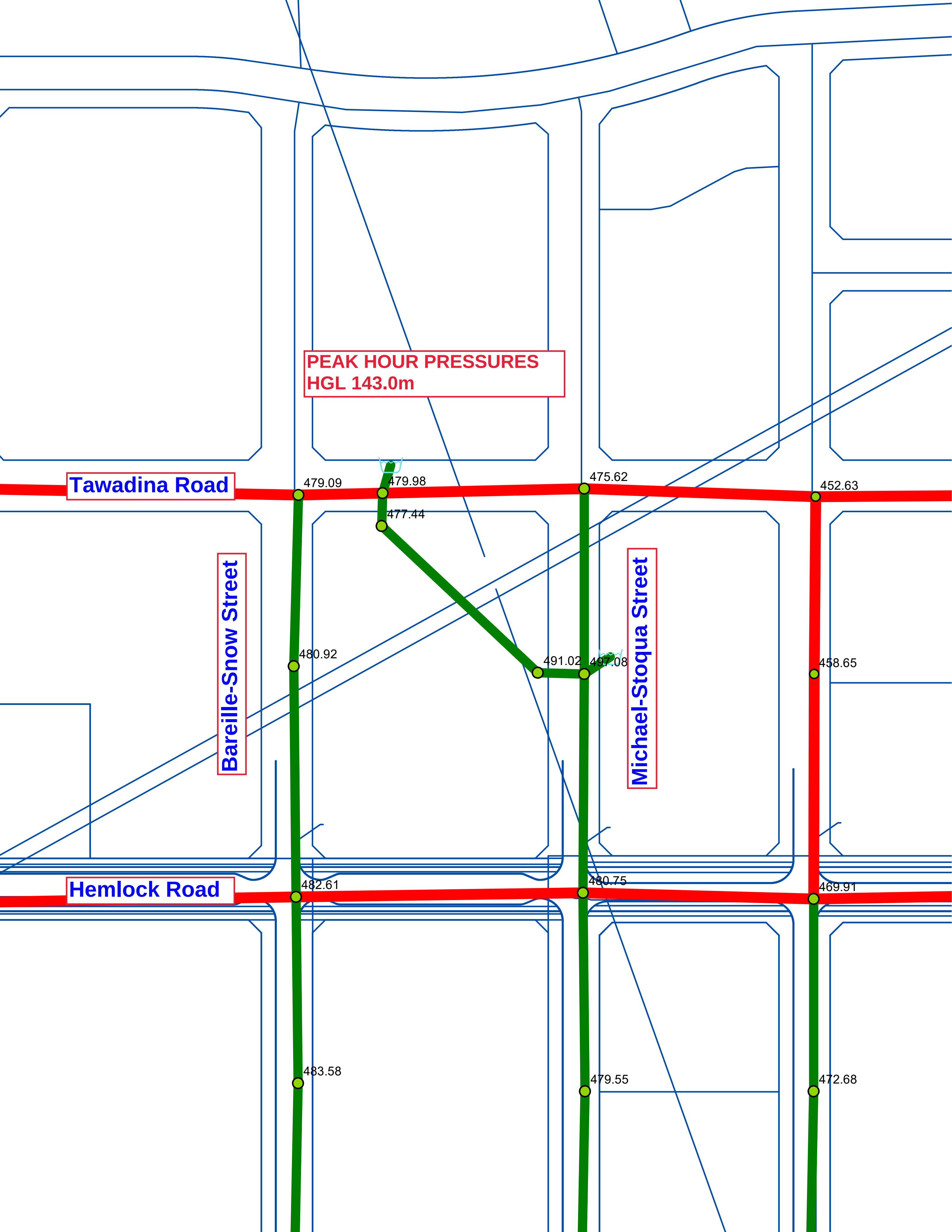
1050 Tawadina Road
WATER MODEL
Tawadina Road
Hemlock Road
Bareille-Snow Street
Michael-Stoqua Street
I14
T-1
B-A
I20
I22
I16
B-B
I18
I24
J64
J66
J68
J82
J80
J78



BASIC DAY PRESSURES
HGL 143.0m
Tawadina Road
490.43
490.79
486.99
464.93
488.01
Bareille-Snow Street
Michael-Stoqua Street
493.34
498.55
471.19
Hemlock Road
495.42
493.40
482.59
496.62
492.27
485.78

Basic Day Pressures

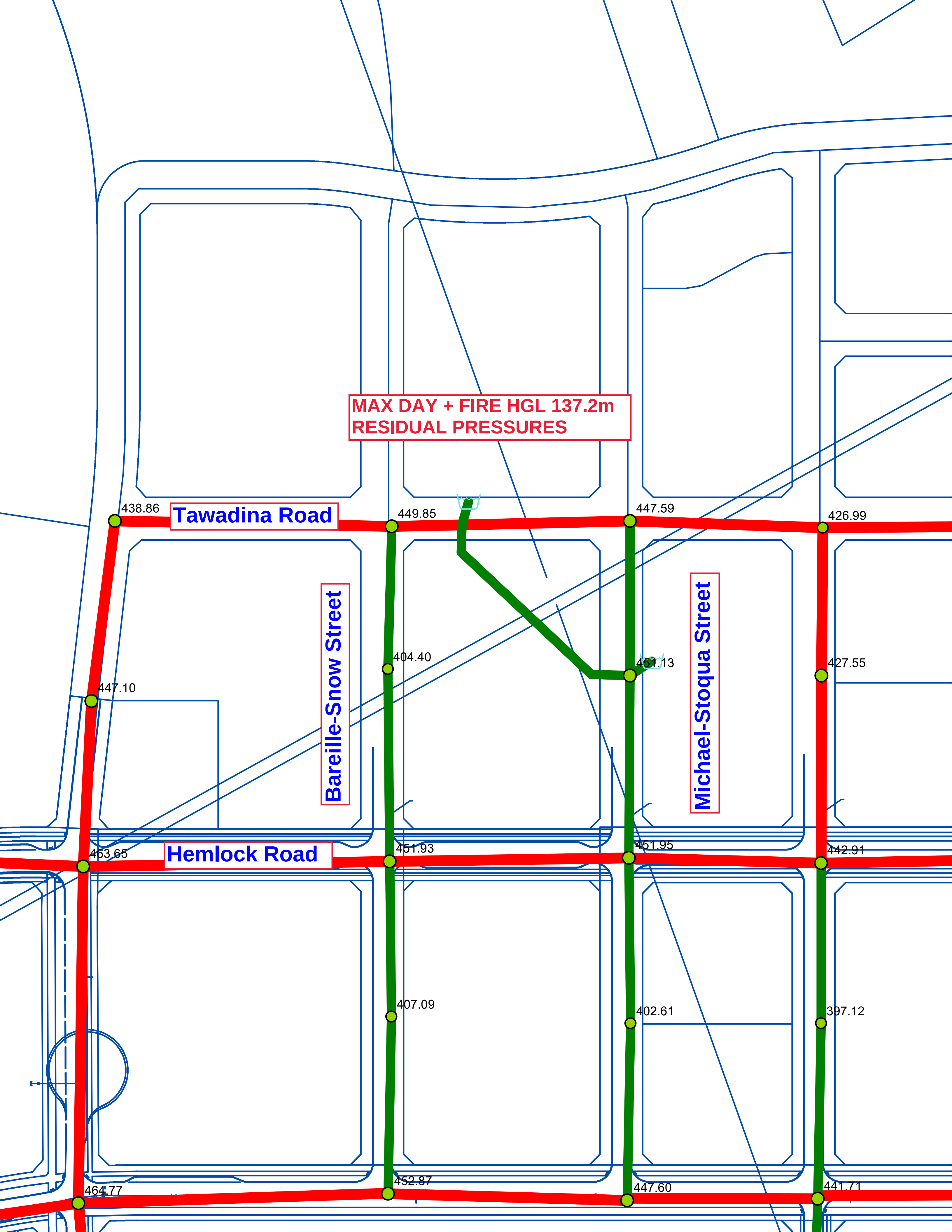
		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	I20	2.19	90.65	140.35	486.99
2	☐	I14	2.19	90.30	140.35	490.43
3	☐	I18	0.73	90.15	141.55	503.67
4	☐	I16	0.73	89.70	140.04	493.34
5	☐	J64	1.49	89.10	139.66	495.42
6	☐	J66	0.98	89.40	139.75	493.40
7	☐	T-1	0.00	90.40	140.49	490.79
8	☐	B-A	0.81	90.80	140.60	488.01
9	☐	B-B	0.60	90.50	141.38	498.55



PEAK HOUR PRESSURES
HGL 143.0m
Tawadina Road
Hemlock Road
Bareille-Snow Street
Michael-Stoqua Street
479.09
479.98
475.62
452.63
477.44
480.92
491.02
497.08
458.65
482.61
480.75
469.91
483.58
479.55
472.68

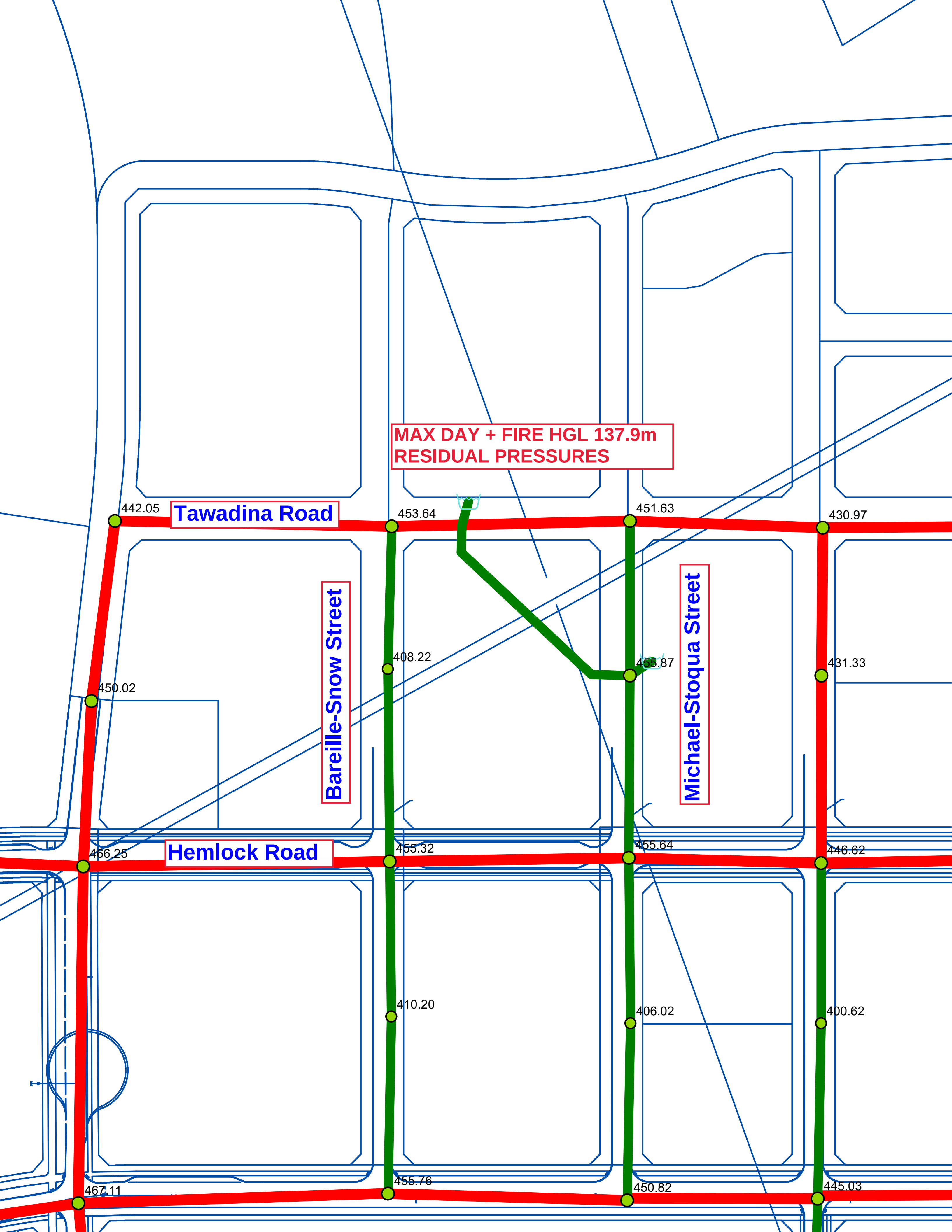
Peak Hour Pressures

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	I20	12.03	90.65	139.19	475.62
2	☐	I14	12.03	90.30	139.19	479.09
3	☐	I18	4.01	90.15	140.88	497.08
4	☐	I16	4.01	89.70	138.78	480.92
5	☐	J64	8.18	89.10	138.35	482.61
6	☐	J66	5.38	89.40	138.46	480.75
7	☐	T-1	0.00	90.40	139.38	479.98
8	☐	B-A	4.43	90.80	139.52	477.44
9	☐	B-B	3.28	90.50	140.61	491.02


MAX DAY + FIRE HGL 137.2m
RESIDUAL PRESSURES
Tawadina Road
Hemlock Road
Bareille-Snow Street
Michael-Stoqua Street
438.86
449.85
447.59
426.99
404.40
451.13
427.55
447.10
463.65
451.93
451.95
442.91
407.09
402.61
397.12
464.77
452.87
447.60
441.71

Max Day + Fireflow (166)

		ID	Total Demand (L/s)	Hydrant Available Flow (L/s)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (kPa)	Critical Node Pressure at Fire Demand (kPa)	Critical Pressure for Design Run (kPa)	Hydrant Design Flow (L/s)	Hydrant Pressure at Design Flow (kPa)
1	☐	I20	222.14	1,872.48	I20	139.98	447.59	139.96	1,872.52	139.98
2	☐	I14	222.14	1,929.31	I14	139.98	449.85	139.96	1,929.36	139.98
3	☐	I18	218.49	1,522.77	R02	280.88	299.19	139.96	1,522.77	139.97
4	☐	I16	218.49	560.71	I16	139.96	404.40	139.96	560.72	139.96
5	☐	J64	220.39	1,295.15	J64	139.97	451.93	139.96	1,295.16	139.97
6	☐	J66	219.12	1,377.44	J66	139.97	451.95	139.96	1,377.45	139.97



MAX DAY + FIRE HGL 137.9m
RESIDUAL PRESSURES
Tawadina Road
Hemlock Road
Bareille-Snow Street
Michael-Stoqua Street
442.05
453.64
451.63
430.97
408.22
455.87
431.33
450.02
466.25
455.32
455.64
446.62
410.20
406.02
400.62
467.11
455.76
450.82
445.03

Max Day + Firelow (183)

		ID	Total Demand (L/s)	Hydrant Available Flow (L/s)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (kPa)	Critical Node Pressure at Fire Demand (kPa)	Critical Pressure for Design Run (kPa)	Hydrant Design Flow (L/s)	Hydrant Pressure at Design Flow (kPa)
1	☐	I20	222.14	1,889.92	I20	139.98	451.63	139.96	1,889.96	139.98
2	☐	I14	222.14	1,947.66	I14	139.98	453.64	139.96	1,947.71	139.98
3	☐	I18	218.49	1,537.13	R02	282.03	300.16	139.96	1,537.13	139.97
4	☐	I16	218.49	564.22	I16	139.96	408.22	139.96	564.22	139.96
5	☐	J64	220.39	1,305.39	J64	139.97	455.32	139.96	1,305.41	139.97
6	☐	J66	219.12	1,388.65	J66	139.97	455.64	139.96	1,388.67	139.97

Chetrar, Anton

From: Brogan Gordon-Cooper <Brogan@faasarch.com>
Sent: Monday, July 31, 2023 4:25 PM
To: Anton Chetrar
Cc: Christine McCuaig; James Andalis
Subject: RE: 1050 Tawadina - Civil Package Revisions and Response

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Anton,

I reviewed the below internally with James Andalis, and we agree with the assumptions used for the Fire Flow Calculations for Type of Construction, Occupancy and Contents, and Automatic Sprinkler Protection.

Please amend this email confirmation with your response and let us know if you have any additional questions or concerns.

Thank-you,

FAAS
Brogan Gordon-Cooper
ARCHITECT, AAA, M.Arch
P. 587-358-0456

From: Anton Chetrar <Anton.Chetrar@ibigroup.com>
Sent: Monday, July 31, 2023 1:36 PM
To: Brogan Gordon-Cooper <Brogan@faasarch.com>
Cc: Christine McCuaig <christine@q9planning.com>
Subject: RE: 1050 Tawadina - Civil Package Revisions and Response

Hi Brogan,

Please find attached most up to date drawings including CAD files.

In regards to the fireflow, the city is looking to get confirmation that the assumptions used for the fire flow calculation are correct. We will need items 2,4 and 5 confirmed: Type of construction, Occupancy and Contents, and Type of Sprinkler system being used. These calculations are included in our Servicing Brief, Water Distribution section and can be updated within a day of receiving the information.

2	**Type of Construction**	**Type V** Wood Frame	1.5	Type II Noncombustible Construction	0.8
		Type III Ordinary Construction	1.0		
		Type II Noncombustible Construction	0.8		
		Type I Fire Resistive Construction	0.6		
3	**Required Fire Flow**	RFF = $220C\sqrt{A}$			
4	**Occupancy and Contents**	Noncombustible Contents	-25%	Noncombustible Contents.	-25%
		Limited Conbustible Contents	-15%		
		Combustible Contents	0%		
		Free Burning Contents	15%		
		Rapid Burning Contents	25%		
	Fire Flow				
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA	-30%	Yes	-30%
		Standard Water Supply for both the system and Fire Department Hose Lines	-10%	Yes	-10%
		Fully Supervised System	-10%	No	
	Fire Flow				

Let me know if any questions.

Regards,
Anton Chetrar | P.ENG.
Cell 613-882-8197

Suite 500, 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel +1 613 225 1311 ext 64072

From: Brogan Gordon-Cooper <Brogan@faasarch.com>
Sent: Monday, July 31, 2023 1:15 PM
To: Anton Chetrar <Anton.Chetrar@ibigroup.com>
Cc: Christine McCuaig <christine@q9planning.com>
Subject: FW: 1050 Tawadina - Civil Package Revisions and Response

Hi Anton,

I am following up with structural on the USF and TOF elevations for item number 24 and hoping to have that resolved shortly – however as previously noted these numbers would be preliminary in nature and might change as we develop the building permit and IFC drawings.

For the fire flow calculation, I believe we chatted about the items required from FAAS. However, can you please send any outstanding information you require to complete the calculation and confirm how long it will take your team to provide the letter once that information is provided?

Finally, could you please send me a copy of all the most current civil plans, PDF and CAD downsaved to 2017 or earlier? I just want to ensure our plans match yours completely.

Thank-you,

FAAS

Brogan Gordon-Cooper
ARCHITECT, AAA, M.Arch
P. 587-358-0456

From: Christine McCuaig <christine@q9planning.com>
Sent: Wednesday, July 26, 2023 8:40 AM
To: James Andalis <james@faasarch.com>; Brogan Gordon-Cooper <Brogan@faasarch.com>
Subject: Fwd: 1050 Tawadina - Civil Package Revisions and Response

Hi James and Brogan,

Please see below.

Per city comment 24 -- this was the request for USF and TOF elevations -- and as we discussed in our call, we were going to provide close approximations. Brogan -- can you confirm if this info is on the current package you sent out?

Per city comment 31 - City comment is "Please provide an email confirmation or memo from the architect confirming that all the parameters used in the fire flow calculations are applicable. This includes, floor area (protected vertical openings), occupancy charge, sprinkler reduction and type of construction. Please have the email or memo appended to the report." Do you have a response for this that you can flip over to Anton?

Thanks
Christine

Christine McCuaig, RPP MCIP M.Pl
c. 613-850-8345

---------- Forwarded message ---------
From: **Anton Chetrar** <Anton.Chetrar@ibigroup.com>
Date: Tue, Jul 25, 2023 at 3:43 PM
Subject: RE: 1050 Tawadina - Civil Package Revisions and Response
To: Christine McCuaig <christine@q9planning.com>
Cc: Jim Moffatt <jmoffatt@ibigroup.com>, denich.c@aquaforbeech.com <denich.c@aquaforbeech.com>

Hi Christine,

Please find attached our current response document. There are a few items on which we are waiting information from others:

- Item #24 (Structural)
- Item #31 (Architect)

- Item #35 (Mechanical)
- Item #36 (LID)
- Item #37 (LID)
- Item #38 (LID)
- Item #58 (LID)

For the LID part, we are following up with McIntoshPerry and it appears that the infiltration testing has not yet been completed as per attached e-mail.

If you have any questions, please let us know.

Thanks,

Anton Chetrar | P.ENG.

Cell 613-882-8197

Suite 500, 333 Preston Street

Ottawa ON K1S 5N4 Canada

tel +1 613 225 1311 ext 64072

From: Christine McCuaig <christine@q9planning.com>
Sent: Tuesday, July 25, 2023 11:52 AM
To: Jim Moffatt <jmoffatt@ibigroup.com>; Anton Chetrar <Anton.Chetrar@ibigroup.com>; Demetrius Yannoulopoulos <dyannoulopoulos@ibigroup.com>
Subject: 1050 Tawadina - Civil Package Revisions and Response

Hi All,

Just wanted to check in and re-assess where we are at for the civil resubmission. Please give me an overview of what you need still -- bear in mind that I will be tackling any responses that we have previously discussed where the City is asking or making comments that are beyond the scope of SPC.

Thanks

Christine

Christine McCuaig, RPP MCIP M.Pl

Principal Senior Planner & Project Manager

613-850-8345

Q9 Planning & Design

ARCADIS IBI GROUP
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
ibigroup.com

WATERMAIN DEMAND CALCULATION SHEET
1050 Tawadina Road | WestUrban Deveopments Ltd.
142609-6.0 | Rev #2 | 2023-10-24
Prepared By: AB | Checked By: AC

NODE	RESIDENTIAL				NON-RESIDENTIAL (ICI)			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND (l/min)
	SINGLE FAMILY UNITS	APARTMENT 1 Bedroom	APARTMENT 2 Bedroom	POPULATION	INDUST. (ha)	COMM. (ha)	INSTIT. (ha)	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	
BUILDING A		83	63	248.50				0.81		0.81	2.01		2.01	4.43		4.43	11,000
BUILDING B		61	47	184.10				0.60		0.60	1.49		1.49	3.28		3.28	10,000
TOTAL		**144**	**110**	**432.60**						**1.40**			**3.50**			**7.71**	

ASSUMPTIONS

POPULATION DENSITY

Single Family	3.4	persons/unit
Townhouse	2.7	persons/unit
Apartment - 1 Bedroom	1.4	persons/unit
Apartment - 2 Bedroom	2.1	persons/unit

WATER DEMAND RATES

Residential	280	l/cap/day
Commercial Shopping Center	2,500	L/(1000m2)/day

PEAKING FACTORS FOR POP. OF 501 TO 3000

Maximum Daily	Residential	2.5	x avg. day
	Commercial	1.5	x avg. day
Maximum Hourly	Residential	2.2	x max. day
	Commercial	1.8	x max. day

FIRE DEMANDS

Single Family	10,000 l/min (166.7 l/s)
Semi Detached & Townhouse	10,000 l/min (166.7 l/s)
Medium Density	15,000 l/min (250 l/s)

ARCADIS IBI GROUP
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
ibigroup.com

FIRE UNDERWRITERS SURVEY

1050 Tawadina Road | WestUrban Deveopments Ltd.
142609-6.0 | Rev #2 | 2024-03-01
Prepared By: AB | Checked By: AC

STEP	Contents	Description		Adjustment Factor		Result	
1	Floor Area	Building A					
	Total Storey					9	storey
	Total Effective Floor Area					**11409**	m2
2	**Type of Construction**	**Type V** Wood Frame	1.5	Type II Noncombustible Construction	0.8		
		Type III Ordinary Construction	1.0				
		Type II Noncombustible Construction	0.8				
		Type I Fire Resistive Construction	0.6				
3	**Required Fire Flow**	RFF = 220C√A				**19000**	L/min
4	**Occupancy and Contents**	Noncombustible Contents	-25%	Noncombustible Contents.	-25%	-4750	L/min
		Limited Conbustible Contents	-15%				
		Combustible Contents	0%				
		Free Burning Contents	15%				
		Rapid Burning Contents	25%				
	Fire Flow					**14250**	L/min
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA 13	-30%	Yes	-30%	-4275	L/min
		Standard Water Supply for both the system and Fire Department Hose Lines	-10%	Yes	-10%	-1425	L/min
		Fully Supervised System	-10%	No			
	Fire Flow					**-5700**	L/min
6	**Exposure Adjustment**	Based on **Table 6** Exposure Adjustement Charges for Subject Building					
	North	Separation (m)	>30	With unprotected opening	0%	0	L/min
		Length X Height Factor (m.storeys)	0				
		Construction Type	Type II				
	South	Separation (m)	6.208	With unprotected opening	20%	2850	L/min
		Length X Height Factor (m.storeys)					
		Construction Type	Type II				
	East	Separation (m)	>30	With unprotected opening	0%	0	L/min
		Length X Height Factor (m.storeys)	0				
		Construction Type	Type II				
	West	Separation (m)	>30	With unprotected opening	0%	0	L/min
		Length X Height Factor (m.storeys)	0				
		Construction Type	Type II				
	Fire Flow					**2850**	L/min
7	**Total Required Fire Flow**					**11400**	
		Rounded to Nearest 1000 L/min				**11000**	L/min

Notes 1. Fire flow calculation are based on Fire Underwriters Survey version 2020.

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FIRE UNDERWRITERS SURVEY
1050 Tawadina Road | WestUrban Deveopments Ltd.
142609-6.0 | Rev #2 | 2024-03-01
Prepared By: AB | Checked By: AC

STEP	Contents	Description		Adjustment Factor		Result	
1	Floor Area	Building B					m2
	Total Storey					9	storey
	Total Effective Floor Area					**8844**	m2
2	**Type of Construction**	**Type V** Wood Frame	1.5	Type II Noncombustible Construction	0.8		
		Type III Ordinary Construction	1.0				
		Type II Noncombustible Construction	0.8				
		Type I Fire Resistive Construction	0.6				
3	**Required Fire Flow**	RFF = 220C√A				**17000**	L/min
4	**Occupancy and Contents**	Noncombustible Contents	-25%	Noncombustible Contents.	-25%	-4250	L/min
		Limited Conbustible Contents	-15%				
		Combustible Contents	0%				
		Free Burning Contents	15%				
		Rapid Burning Contents	25%				
	Fire Flow					**12750**	L/min
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA 13	-30%	Yes	-30%	-3825	L/min
		Standard Water Supply for both the system and Fire Department Hose Lines	-10%	Yes	-10%	-1275	L/min
		Fully Supervised System	-10%	No			
	Fire Flow					**-5100**	L/min
6	**Exposure Adjustment**	Based on **Table 6** Exposure Adjustement Charges for Subject Building					
	North	Separation (m)	6.2	With unprotected opening	20%	2550	L/min
		Length X Height Factor (m.storeys)					
		Construction Type	Type II				
	South	Separation (m)	>30	With unprotected opening	0%	0	L/min
		Length X Height Factor (m.storeys)	0				
		Construction Type	Type II				
	East	Separation (m)	>30	With unprotected opening	0%	0	L/min
		Length X Height Factor (m.storeys)	0				
		Construction Type	Type II				
	West	Separation (m)	>30	With unprotected opening	0%	0	L/min
		Length X Height Factor (m.storeys)	0				
		Construction Type	Type II				
	Fire Flow					**2550**	L/min
7	**Total Required Fire Flow**					**10200**	
		Rounded to Nearest 1000 L/min				**10000**	L/min

Notes 1. Fire flow calculation are based on Fire Underwriters Survey version 2020.

22.01 Waterridge Areas			JM		2024-02-27

Building A Building Area		
Level	Area (m^2)	Area (ft^2)
Main Floor	1919.1 m^2	20657 ft^2
2nd Floor	2003.2 m^2	21562 ft^2
3rd Floor	2003.2 m^2	21562 ft^2
4th Floor	1208.5 m^2	13008 ft^2
5th Floor	1112.8 m^2	11978 ft^2
6th Floor	1112.8 m^2	11978 ft^2
7th Floor	683.2 m^2	7354 ft^2
8th Floor	683.2 m^2	7354 ft^2
9th Floor	683.2 m^2	7354 ft^2
Total	**11409.2 m^2**	**122807 ft^2**

Building B Building area		
Level	Area (m^2)	Area (ft^2)
Main Floor	1415.6 m^2	15237 ft^2
2nd Floor	1331.0 m^2	14326 ft^2
3rd Floor	1331.0 m^2	14326 ft^2
4th Floor	898.9 m^2	9675 ft^2
5th Floor	898.9 m^2	9675 ft^2
6th Floor	742.3 m^2	7990 ft^2
7th Floor	742.3 m^2	7990 ft^2
8th Floor	742.3 m^2	7990 ft^2
9th Floor	742.3 m^2	7990 ft^2
Total	**8844.2 m^2**	**95199 ft^2**

Notes: Areas measured from outside of Sheathing

Building A Gross Floor Area		
Level	Area (m^2)	Area (ft^2)
Main Floor	1564.3 m^2	16838 ft^2
2nd Floor	1651.0 m^2	17771 ft^2
3rd Floor	1651.0 m^2	17771 ft^2
4th Floor	957.8 m^2	10310 ft^2
5th Floor	877.8 m^2	9449 ft^2
6th Floor	877.8 m^2	9449 ft^2
7th Floor	500.5 m^2	5388 ft^2
8th Floor	500.5 m^2	5388 ft^2
9th Floor	500.5 m^2	5387 ft^2
Total	**9081.4 m^2**	**97751 ft^2**

Building B Gross Floor Area		
Level	Area (m^2)	Area (ft^2)
Main Floor	995.3 m^2	10713 ft^2
2nd Floor	106.7 m^2	1148 ft^2
3rd Floor	1072.7 m^2	11546 ft^2
4th Floor	698.2 m^2	7515 ft^2
5th Floor	698.2 m^2	7515 ft^2
6th Floor	552.0 m^2	5942 ft^2
7th Floor	552.0 m^2	5942 ft^2
8th Floor	552.0 m^2	5942 ft^2
9th Floor	552.0 m^2	5942 ft^2
Total	**5779.1 m^2**	**62205 ft^2**

Notes: Areas base on the below definition from the City of Ottawa Zoning Bylaw (By-law 2008-250 , Section 54)

Gross Floor Area means the total area of each floor whether located above, at or below grade, measured from the interiors of outside walls and including floor area occupied by interior walls and floor area created by bay windows, but excluding;

(a) floor area occupied by shared mechanical, service and electrical equipment that serve the building (By-law 2008-326)

(b) common hallways, corridors, stairwells, elevator shafts and other voids, steps and landings; (By-law 2008-326) (By-law 2017-302)

(c) bicycle parking; motor vehicle parking or loading facilities;

(d) common laundry, storage and washroom facilities that serve the building or tenants;

(e) common storage areas that are accessory to the principal use of the building; (By-law 2008-326)

(f) common amenity area and play areas accessory to a principal use on the lot; and (By-law 2008-326)

(g) living quarters for a caretaker of the building. (surface de plancher hors oeuvre brute)

APPENDIX C

Sanitary Sewer Design Sheet
Wateridge Phase 2B Sanitary Design Sheet
Wateridge Phase 2B Sanitary Drainage Area Plan
Wateridge Phase 2B Sanitary Design Sheet Update
Wateridge Phase 1B Sanitary Design Sheet Update
Wateridge Phase 1A Sanitary Design Sheet Update

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SANITARY SEWER DESIGN SHEET

1050 Tawadina Road
WestUrban Developments Ltd.
CITY OF OTTAWA

LOCATION				RESIDENTIAL									
				AREA w/ Units	UNIT TYPES				AREA w/o Units	POPULATION		RES PEAK FACTOR	PEAK FLOW
STREET	AREA ID	FROM MH	TO MH	(Ha)	SF	TYP. APT	1 Bed APT	2 Bed APT	(Ha)	IND	CUM		(L/s)
Michael-Stoqua Street		BLDG A/B	CTRL MH1A	0.72			146	108		431.2	431.2	3.41	4.76
		CTRL MH1A	TEE							0.0	431.2	3.41	4.76

LOCATION			ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
			AREA (Ha)						ICI PEAK FACTOR	PEAK FLOW	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY (full)	AVAILABLE CAPACITY	
			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL																
STREET	FROM MH	TO MH	IND	CUM	IND	CUM	IND	CUM		(L/s)	IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	L/s	(%)
Michael-Stoqua Street	BLDG A/B	CTRL MH1A	0.00	0.0	0.00	0.0	0.00	0.0	1.00	0.00	0.72	0.72	0.24	0.00	0.00	5.00	40.49	4.26	200	1.40	1.248	35.49	87.66%
	CTRL MH1A	TEE	0.00	0.0	0.00	0.0	0.00	0.0	1.00	0.00	0.00	0.72	0.24	0.00	0.00	5.00	34.22	10.77	200	1.00	1.055	29.22	85.40%

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u				
APT	1.8	p/p/u	INST	28,000	L/Ha/day	
1 Bed	1.4	p/p/u	COM	28,000	L/Ha/day	
2 Bed	2.1	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area, 1.5 if greater than 20%, otherwise 1.0

Designed: AC

Checked: JIM

Dwg. Reference: 142609

No.	Revision	Date
1.	Servicing Brief - Submission No. 1	2023-07-04
2	Servicing Brief - Submission No. 2	2023-12-05
3.	Servicing Brief - Submission No. 4	2024-03-27

File Reference:	Date:	Sheet No:
142609-6.04.04	2024-03-27	1 of 1

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LEGEND

MH231A Existing infrastructure (shown for information only)
Block 11 Proposed Conditions (DesignWorks Engineering)

SANITARY SEWER DESIGN SHEET

Wateridge at Rockcliffe - Phase 2B
City of Ottawa
Canada Lands Company

LOCATION				RESIDENTIAL									
STREET	AREA ID	FROM MH	TO MH	AREA w/ Units (Ha)	UNIT TYPES: SF	SD / TH/F	TH/S	APT	AREA w/o Units (Ha)	POPULATION: IND	CUM	RES PEAK FACTOR	PEAK FLOW (L/s)
Tawadina Road	MH300A	MH300A	MH301A	0.47		15				40.5	40.5	3.67	0.48
Tawadina Road	MH301A	MH301A	MH302A	0.54		14				37.8	78.3	3.62	0.92
Tawadina Road	MH302A	MH302A	MH303A	0.26		2				5.4	83.7	3.61	0.98
Tawadina Road	MH303A	MH303A	MH304A	0.93				240		432.0	515.7	3.37	5.64
Tawadina Road	MH305A	MH305A	MH304A	0.24						0.0	0.0	3.80	0.00
Bareille-Snow Street	EXT-1	BULK304AN	MH304A	7.35				905		1629.0	1629.0	3.12	16.49
Bareille-Snow Street	MH304A-1, MH304A-2	MH304A	MH308A	0.76				52		93.6	2238.3	3.04	22.04
Bareille-Snow Street	MH308A	MH308A	BULK206AN	0.96				352		633.6	2871.9	2.97	27.61
Bareille-Snow Street		BULK206AN	MH206A							0.0	2871.9	2.97	27.61
Codd's Road	MH340A	MH340A	BLK231AN	0.88				212		381.6	381.6	3.43	4.24
Codd's Road		*MH231A*	*BULK176AN*							*0.0*	*381.6*	*3.43*	*4.24*

STREET	FROM MH	TO MH	ICI AREAS – AREA (Ha): INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	ICI PEAK FACTOR	PEAK FLOW (L/s)	INFILTRATION ALLOWANCE – AREA (Ha): IND	CUM	FLOW (L/s)	FIXED FLOW (L/s): IND	CUM	TOTAL FLOW (L/s)	PROPOSED SEWER DESIGN: CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY L/s	(%)
Tawadina Road	MH300A	MH301A	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.47	2.43	0.80	0.00	0.00	2.24	*31.02*	*109.85*	*250*	*0.25*	0.612	28.78	92.79%
Tawadina Road	MH301A	MH302A	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.54	2.97	0.98	0.00	0.00	2.85	*59.18*	*110.39*	*250*	*0.91*	1.168	56.33	95.18%
Tawadina Road	MH302A	MH303A	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.26	3.23	1.07	0.00	0.00	3.00	*72.61*	*111.69*	*250*	*1.37*	1.433	69.62	95.87%
Tawadina Road	MH303A	MH304A	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.93	4.16	1.37	0.00	0.00	7.96	31.02	112.10	250	0.25	0.612	23.06	74.33%
Tawadina Road	MH305A	MH304A	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.24	0.24	0.08	0.00	0.00	0.08	49.63	111.61	250	0.64	0.979	49.55	99.84%
										0.00													
Bareille-Snow Street	BULK304AN	MH304A	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	7.35	7.35	2.43	0.00	0.00	18.91	31.02	20.00	250	0.25	0.612	12.11	39.04%
Bareille-Snow Street	MH304A	MH308A	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.76	12.51	4.13	0.00	0.00	26.80	39.72	119.21	250	0.41	0.784	12.93	32.54%
Bareille-Snow Street	MH308A	BULK206AN	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.96	13.47	4.45	0.00	0.00	32.69	84.15	16.82	250	1.84	1.661	51.46	61.15%
Bareille-Snow Street	BULK206AN	MH206A	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.00	13.47	4.45	0.00	0.00	32.69	88.83	21.00	250	2.05	1.753	56.13	63.20%
Codd's Road	MH340A	BLK231AN	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.88	0.88	0.29	0.00	0.00	4.53	75.98	70.00	250	1.50	1.500	71.46	94.04%
Codd's Road	*MH231A*	*BULK176AN*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.88*	*0.29*	*0.00*	*0.00*	*4.53*	*83.92*	*50.22*	*250*	*1.83*	*1.656*	*79.40*	*94.61%*

Design Parameters:

Residential			ICI Areas		
SF	3.4	p/p/u	INST	28,000	L/Ha/day
TH/F/SD	2.7	p/p/u	COM	28,000	L/Ha/day
TH/S	2.3	p/p/u	IND	35,000	L/Ha/day
APT	1.8	p/p/u			MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,
   1.5 if greater than 20%, otherwise 1.0

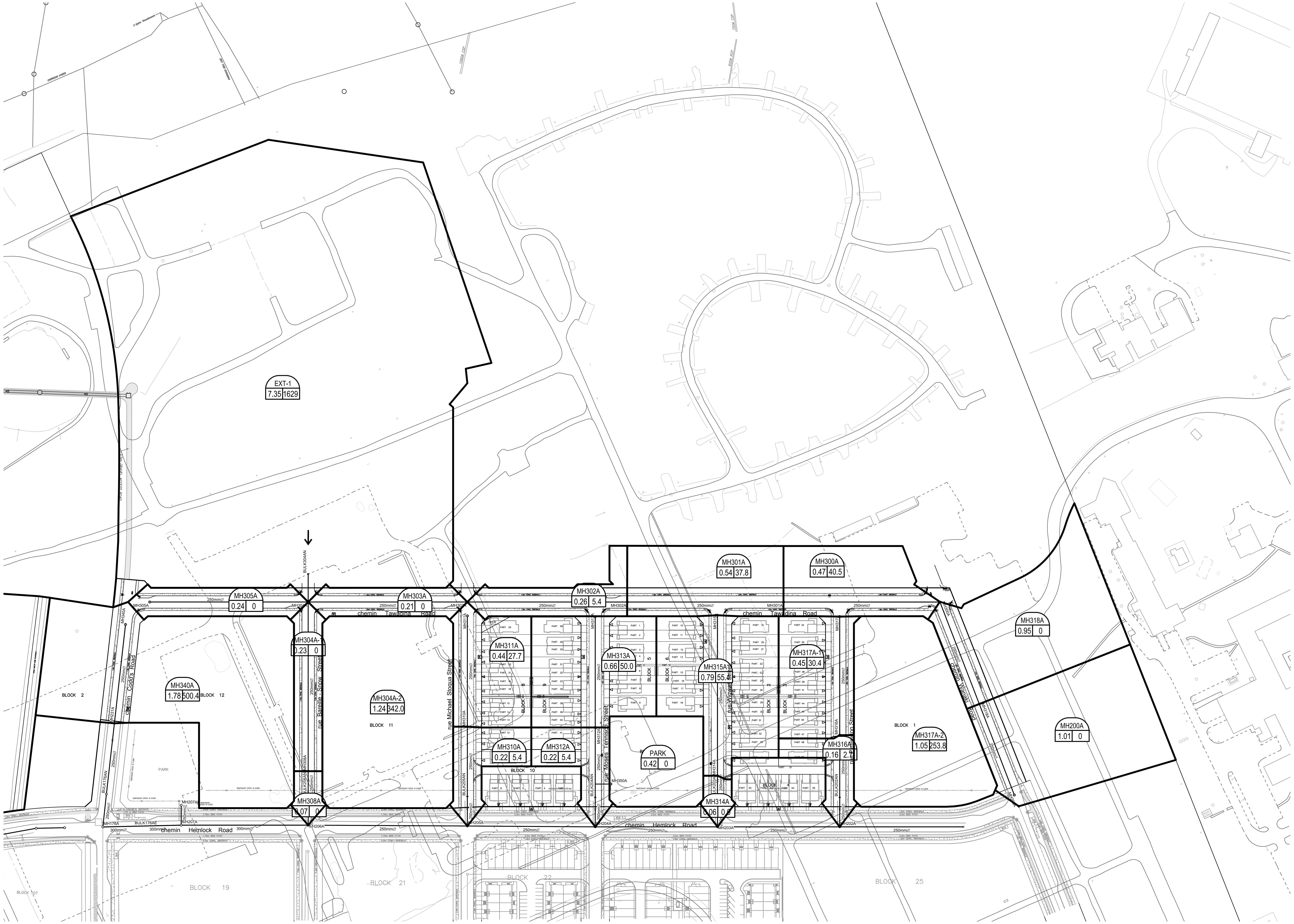
Designed: KH

Checked: JIM

Dwg. Reference: 118863-400

No.	Revision	Date
1	Submission No. 1 for City Review	2018-12-20
2	Submission No. 2 for City Review	2019-03-15
3	MECP Submission	2019-04-17
4	Record information Added (No.1)	2020-10-08
5	Record information Added (No.2)	2021-03-23

File Reference:	Date:	Sheet No:
118863.5.7.1	2021-03-31	1 of 1



SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN
NTS

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7	REVISED PER SERVICING CHANGES FOR BLOCKS 8, 9, 10	J.I.M.	2021-03-17
6	ISSUED FOR CONSTRUCTION	J.I.M.	2019:09:10
5	RE-ISSUED FOR RFP	J.I.M.	2019:07:02
4	ISSUED FOR RFP	J.I.M.	2019:05:17
3	MECP SUBMISSION	J.I.M.	2019:04:17
2	SUBMISSION NO. 2 FOR CITY REVIEW	J.I.M.	2019:03:15
1	SUBMISSION NO. 1 FOR CITY REVIEW	J.I.M.	2018:12:20

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Project Title
WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 2B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2021/03/17
PROVINCE OF ONTARIO

N

Drawing Title
SANITARY DRAINAGE AREA PLAN

Scale
1:1500

Design	Date
K.H.	DECEMBER 2018
Drawn	**Checked**
M.M.	J.I.M.
Project No.	**Drawing No.**
118863	400

D07-16-15-0003_P2B

J:\118863_Wtridge2A2B\5.9 Drawings\59civil\layouts\400 SANITARY.dwg, 2021-03-17 9:15:48 AM, AutoCAD PDF (High Quality Print).pc3

#17063

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LEGEND
Existing infrastructure (shown for information only)
1050 Tawadina

SANITARY SEWER DESIGN SHEET

Wateridge at Rockcliffe - Phase 2B
City of Ottawa
Canada Lands Company

LOCATION: STREET	LOCATION: AREA ID	LOCATION: FROM MH	LOCATION: TO MH	RESIDENTIAL: AREA w/ Units (Ha)	RESIDENTIAL: UNIT TYPES SF	RESIDENTIAL: UNIT TYPES SD / TH/F	RESIDENTIAL: UNIT TYPES TH/S	RESIDENTIAL: UNIT TYPES APT	RESIDENTIAL: AREA w/o Units (Ha)	RESIDENTIAL: POPULATION IND	RESIDENTIAL: POPULATION CUM	RESIDENTIAL: RES PEAK FACTOR	RESIDENTIAL: PEAK FLOW (L/s)	ICI AREAS: AREA (Ha) INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	ICI PEAK FACTOR	ICI PEAK FLOW (L/s)	INFILTRATION ALLOWANCE: AREA (Ha) IND	INFILTRATION AREA (Ha) CUM	INFILTRATION FLOW (L/s)	FIXED FLOW (L/s) IND	FIXED FLOW (L/s) CUM	TOTAL FLOW (L/s)	PROPOSED SEWER DESIGN: CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY L/s	AVAILABLE CAPACITY (%)
Michael Stoqua Street	MH311A	MH311A	MH310A	0.44	1	9		240		459.7	459.7	3.39	5.06	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.44	0.44	0.15	0.00	0.00	5.20	72.35	77.82	250	1.36	1.428	67.15	92.81%
Michael Stoqua Street	MH310A	MH310A	BULK205AN	0.21		2				5.4	465.1	3.39	5.11	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.65	0.21	0.00	0.00	5.33	65.66	49.19	250	1.12	1.296	60.33	91.89%
Michael Stoqua Street	-	*BULK205AN*	*MH205A*							*0.0*	*465.1*	*3.39*	*5.11*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.65*	*0.21*	*0.00*	*0.00*	*5.33*	*66.24*	*21.00*	*250*	*1.14*	*1.307*	*60.91*	*91.96%*
																					0.00													
Bareille-Snow Street		BULK206AN	MH206A							0.0	2910.2	2.96	27.94	0.00	0.00	0.00	3.15	0.00	0.00	1.00	1.02	0.00	17.77	5.86	0.00	0.00	34.83	88.83	21.00	250	*2.05*	1.753	54.00	60.79%

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u				
TH/F/SD	2.7	p/p/u	INST	28,000	L/Ha/day	
TH/S	2.3	p/p/u	COM	28,000	L/Ha/day	
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,
   1.5 if greater than 20%, otherwise 1.0

Designed: AC

Checked: JIM

Dwg. Reference: 118863-400

No.	Revision	Date
1	Submission No. 1 for City Review	2018-12-20
2	Upstream Capacity Check	2023-11-29
3	1050 Tawadina outlet to Michael Stoqua	2023-12-05

File Reference:	Date:	Sheet No:
118863.5.7.1	2023-11-29	1 of 1

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1050 Tawadina

AS-BUILT SANITARY SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Canada Lands Company

LOCATION: STREET	LOCATION: AREA ID	LOCATION: FROM MH	LOCATION: TO MH	RESIDENTIAL: AREA Phase 1B (Ha)	UNIT TYPES: SF	UNIT TYPES: SD	UNIT TYPES: TH	UNIT TYPES: APT	AREA EXTERNAL (Ha)	POPULATION: IND	POPULATION: CUM	PEAK FACTOR	PEAK FLOW (L/s)	ICI AREAS (Ha): INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	ICI PEAK FLOW (L/s)	INFILTRATION ALLOWANCE AREA (Ha): IND	INFILTRATION CUM	INFILTRATION FLOW (L/s)	FIXED FLOW (L/s)	TOTAL FLOW (L/s)	PROPOSED SEWER DESIGN: CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY L/s	AVAILABLE CAPACITY (%)
Phase 1B																																
rue Michael Stoqua Street	EX205A	BULK205AN	MH205A						1.38	459.7	459.7	3.39	5.06		0.00		0.00		0.00	0.00	1.38	1.38	0.46	0.00	5.51	66.24	21.00	250	1.14	1.307	60.73	91.68%
Hemlock Road	205A	MH205A	MH206A	0.25						0.0	613.2	3.34	6.64		0.00		0.00		0.00	0.00	0.25	3.23	1.07	0.00	7.71	31.02	111.90	250	0.25	0.612	23.31	75.16%
rue Bareille-Snow Street	EX206A-B	BULK206AN	MH206A							2910.2	2910.2	2.96	27.94		0.00		3.15		0.00	1.02	0.00	17.77	5.86	0.00	34.83	88.83	21.00	250	2.05	1.753	54.00	60.79%
Hemlock Road	206A	MH206A	MH207A	0.20						0.0	3523.4	2.91	33.18		0.00		3.15		0.00	2.73	0.20	21.20	7.00	0.00	42.91	66.15	89.30	300	0.43	0.907	23.24	35.14%
Hemlock Road	PARK1, 207A	MH207A	*BULK176AE*	0.12						0.0	3523.4	2.91	33.18		0.00		3.15		0.00	2.73	0.12	21.64	7.14	0.00	43.05	49.42	33.10	300	0.24	0.677	6.37	12.88%
Phase 1A																																
Hemlock Road		*BULK176AE*	*MH176A*							0.0	3523.4	2.91	33.18		0.00		3.15		0.00	2.73	0.00	21.64	7.14	0.00	43.05	68.42	21.97	300	0.46	0.938	25.37	37.07%
Phase 1B																																
Codd's Road	231A, EXPARK1	MH231A	*BULK176AN*						0.76	43.3	129.0	3.57	1.49		0.00		0.00		0.00	0.00	0.76	1.63	0.54	0.00	2.03	83.92	50.20	250	1.83	1.656	81.89	97.58%
Phase 1A																																
Codd's Road		*BULK176AN*	*MH176A*							0.0	129.0	3.57	1.49		0.00		0.00		0.00	0.00	0.00	1.63	0.54	0.00	2.03	55.49	23.23	250	0.80	1.095	53.46	96.34%

Design Parameters:

Residential			ICI Areas			Peak Factor
SF	3.4	p/p/u	INST	50,000	L/Ha/day	1.5
TH/SD	2.7	p/p/u	COM	50,000	L/Ha/day	1.5
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 300 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+P^0.5))
   where P = population in thousands

Designed: WY

Checked: JIM

Dwg. Reference: 38298-501

No.	Revision	Date
1.	City submission No. 1	2016-07-08
2.	City submission No. 2	2016-11-04
3.	City submission No. 3	2017-01-25
4.	Revised as per Mattamy's Design	2017-12-08
5.	As-Built Submission	2018-01-29
6.	Upstream Capacity Check	2023-11-29

File Reference:	Date:	Sheet No:
38298.5.7.1	2023-11-29	2 of 2

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1050 Tawadina

SANITARY SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Canada Lands Company

LOCATION: STREET	LOCATION: AREA ID	LOCATION: FROM MH	LOCATION: TO MH	RESIDENTIAL: AREA Ph1 (Ha)	RESIDENTIAL: UNIT TYPES SF	UNIT TYPES SD	UNIT TYPES TH	UNIT TYPES APT	AREA External (Ha)	POPULATION IND	POPULATION CUM	PEAK FACTOR	PEAK FLOW (L/s)	ICI AREAS: AREA (Ha) INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	PEAK FLOW (L/s)	INFILTRATION ALLOWANCE: AREA (Ha) IND	AREA (Ha) CUM	FLOW (L/s)	FIXED FLOW (L/s)	TOTAL FLOW (L/s)	PROPOSED SEWER DESIGN: CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY L/s	AVAILABLE CAPACITY (%)
Street No. 11	EXT 11	BULK176AN	MH176A						0.00	129.0	129.0	3.57	1.49		0.00		0.00		0.00	0.00	1.63	1.63	0.54		2.03	56.18	23.23	250	0.82	1.109	54.15	96.39%
Hemlock Road	EXT 10	BULK176AE	MH176A						0.00	3523.4	3523.4	2.91	33.18		0.00		3.15		0.00	2.73	21.64	21.64	7.14		43.05	68.42	21.97	300	0.46	0.938	25.37	37.07%
Codd's Road	176A(a), EXT 14	MH176A	MH142A	0.25					0.86	270.7	3923.1	2.87	36.52		0.00		3.15		0.00	2.73	1.11	24.38	8.05		47.30	81.80	102.77	375	0.20	0.717	34.50	42.17%
Codd's Road	PARKb	BULK142AW	MH142A	0.82						0.0	0.0	3.80	0.00		0.00		0.00		0.00	0.00	0.82	0.82	0.27		0.27	48.45	16.40	250	0.61	0.956	48.18	99.44%
Codd's Road	142A	MH142A	MH141A	0.13						0.0	3923.1	2.87	36.52		0.00		3.15		0.00	2.73	0.13	25.33	8.36		47.62	114.23	53.48	375	0.39	1.002	66.61	58.31%
chemin MIKINAK ROAD	141A	MH141A	MH124A	0.26			5			13.5	8037.3	2.64	68.73		5.11		3.15		0.00	7.17	0.26	61.21	20.20		96.10	128.04	54.85	375	0.49	1.123	31.94	24.95%
EX Shaft	---	MH124A	MH200A							0.0	9238.4	2.59	77.57		5.11		3.15		0.00	7.17	0.00	82.77	27.31		112.06	176.39	116.83	375	0.93	1.547	64.34	36.47%
EX Shaft	---	MH200A	EX. Shaft							0.0	9910.7	2.57	82.44		5.1		3.2		0.0	7.17	0.00	98.24	32.42		122.03	200.37	12.90	375	1.2	1.757	78.34	39.10%

Design Parameters:

Residential			ICI Areas			Peak Factor
SF	3.4	p/p/u	INST	50,000	L/Ha/day	1.5
TH/SD	2.7	p/p/u	COM	50,000	L/Ha/day	1.5
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 300 L/day
3. Infiltration allowance: 0.33 L/s/Ha 0.4 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+P^0.5))
   where P = population in thousands

Designed: AC

Checked: JIM

Dwg. Reference: 38298-501

No.	Revision	Date
1.	Submission No. 1 for City Review	2023-10-26
2.	Upstream Capacity Check	2023-11-29

File Reference:	Date:	Sheet No:
38298.5.7.1	2023-11-29	2 of 2

APPENDIX D

Storm Sewer Design Sheet
142609-500 - Storm Drainage Area Plan
Wateridge Phase 2B Storm Design Sheet
Wateridge Phase 2B Storm Drainage Area Plan
Modified Rational Method on-site SWM calculations
Temporary Orifice Sizing
Sample Runoff Coefficient Calculations
Minor system release rate (Wateridge Phase 2B)
Architectural Drawing SPC.P01, Parkade Plan
Architectural Drawing SPC.110, Roof Plan
Letter from Mechanical Engineer re City Comments
Correspondence from 1375 Hemlock Development re grading

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STORM SEWER DESIGN SHEET
1050 Tawadina Road
WestUrban Developments Ltd.
City of Ottawa

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.40	C= 0.50	C= 0.57	C= 0.65	C= 0.69	C= 0.70	C= 0.79	C= 0.80	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)
BUILDING A	SC3	BUILDING A	CTRL MH1									0.57		1.25	1.25	10.00	0.04	10.04	76.81			
		CTRL MH 1	MH1											0.00	1.25	10.04	0.10	10.14	76.66			

FROM	TO	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW IND	FIXED FLOW CUM	DESIGN FLOW (L/s)	SEWER DATA CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
BUILDING A	CTRL MH1	96.15				0.00	0.00	96.15	142.67	4.29	300			2.00	1.955	46.52	32.61%
CTRL MH 1	MH1	95.97				1.00	1.00	95.97	142.67	12.17	300			2.00	1.955	46.70	32.73%

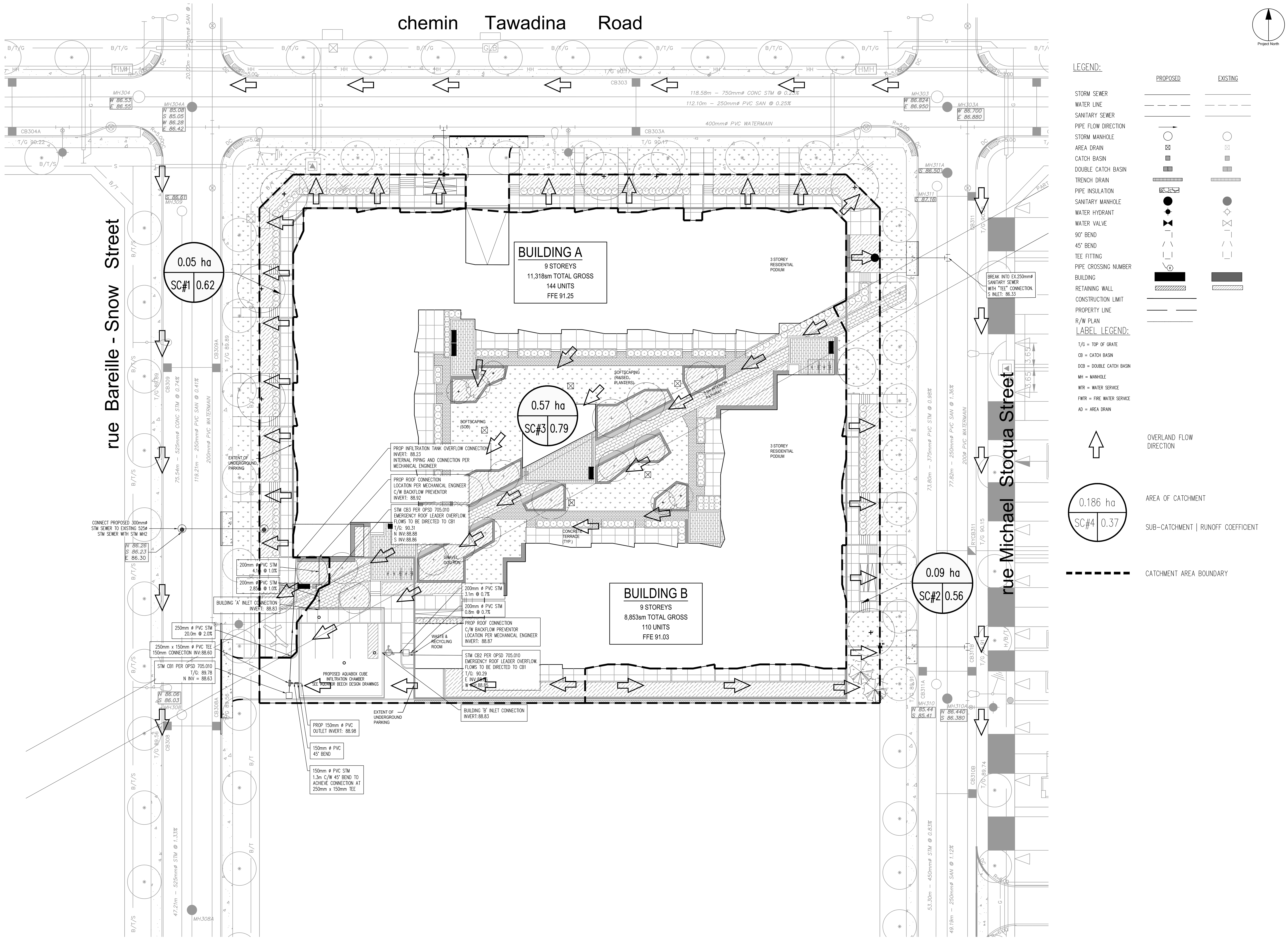
Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: AC
Checked: JIM
Dwg. Reference: 142609-500

No.	Revision	Date
1.	Servicing Brief - Submission No. 2	2023-07-04

File Reference:	Date:	Sheet No:
142609-6.04.04	2023-07-04	1 of 1



CLIENT

WestUrban Developments Ltd.

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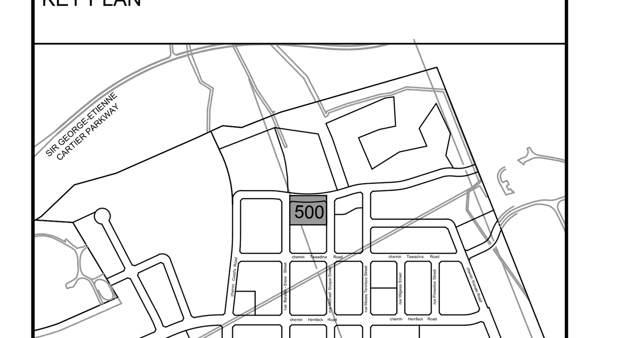
ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CLC SUBMISSION	2023-01-11
2	SUBMISSION NO.2 FOR CITY REVIEW	2023-09-13
3	SUBMISSION NO.3 FOR CITY REVIEW	2023-12-20
4	UPDATED FILE NUMBER	2024-04-03
5		
6		
7		
8		

KEY PLAN



1:250 0 2.5 7.5 12.5m

SEAL

ARCADIS
333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT

1050 Tawadina Road

WATERIDGE VILLAGE PHASE 2

PROJECT NO:
142609

DRAWN BY:	CHECKED BY:
M.M.	J.I.M.
PROJECT MGR:	APPROVED BY:
S.L.	A.C.

SHEET TITLE

STORM DRAINAGE AREA PLAN

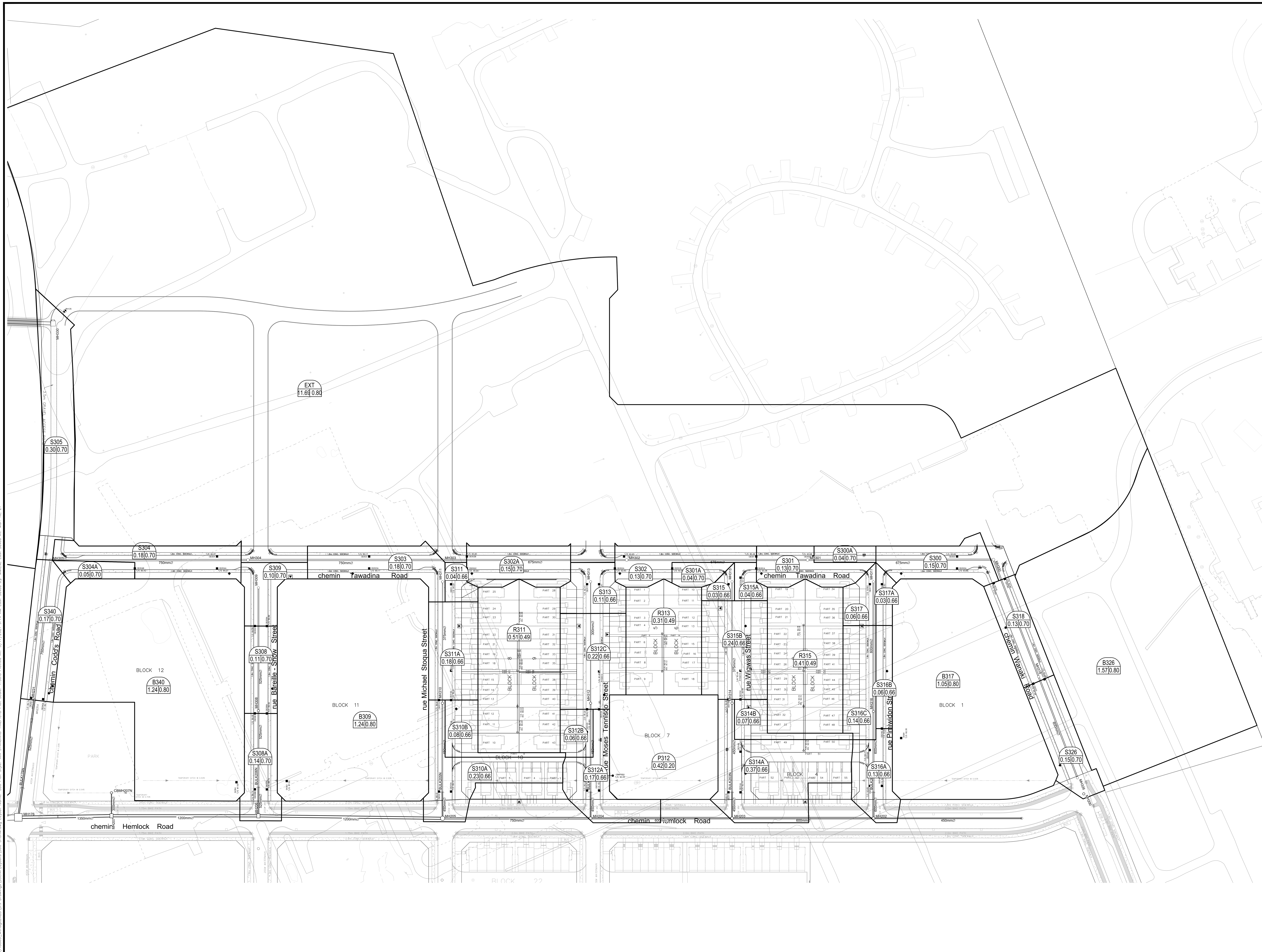
SHEET NUMBER: C-500

ISSUE: 4

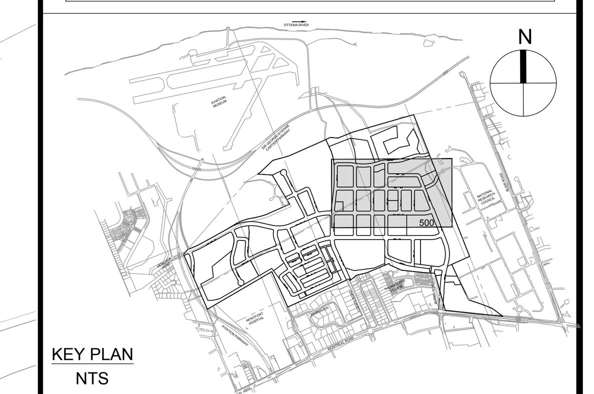
SCALE CHECK 1 in 10mm

File Location: J:\142609_1050_Tawadin\7.0_Production\7.03_Design\04_Civil\Sheets\500_figure 2.dwg Last Saved: September 8, 2023, by MMilne Plotted: Wednesday, April 3, 2024 1:58:52 PM by Samantha Labadie

CITY FILE No. D07-12-23-0023 CITY PLAN No. 18977



SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



KEY PLAN
NTS

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7	REVISED PER SERVICING CHANGES FOR BLOCKS 8, 9, 10	J.I.M.	2021-03-17
6	ISSUED FOR CONSTRUCTION	J.I.M.	2019:09:10
5	RE-ISSUED FOR RFP	J.I.M.	2019:07:02
4	ISSUED FOR RFP	J.I.M.	2019:05:17
3	MECP SUBMISSION	J.I.M.	2019:04:17
2	SUBMISSION NO. 2 FOR CITY REVIEW	J.I.M.	2019:03:15
1	SUBMISSION NO. 1 FOR CITY REVIEW	J.I.M.	2018:12:20

CANADA LANDS COMPANY
SOCIÉTÉ IMMOBILIÈRE DU CANADA
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Ottawa,On
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Ottawa ON K1S 5N4 Canada
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Project Title
WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 2B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2021/03/17
PROVINCE OF ONTARIO

N

Drawing Title
STORM DRAINAGE AREA PLAN

Scale
1:1000

Design	Date
K.H.	DECEMBER 2018
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
118863	500

D07-16-15-0003_P2B

J:\118863_Wtridge2A2B\5.9 Drawings\59civil\layouts\500 STORM.dwg, 2021-03-17 9:14:53 AM, AutoCAD PDF (High Quality Print).pc3

#17063

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LEGEND
Black text 5 year event curve design
Blue text 100 year event curve design
MH206 Existing infrastructure (shown for information only)
MH311 Record Information No. 2

STORM SEWER DESIGN SHEET
Wateridge at Rockcliffe - Phase 2B
City of Ottawa
Canada Lands Company

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW															SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.30	C= 0.40	C= 0.49	C= 0.57	C= 0.65	C= 0.66	C= 0.70	C= 0.73	C= 0.80	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	(%)
Pimiwidon Street	S317A, B317	MH317	MH316							0.09			1.05	2.50	2.50	10.00	0.88	10.88	76.81	104.19	122.14	178.56		260.52				260.52	439.15	79.15	600			0.47	1.505	178.63	40.68%
Pimiwidon Street	S316A-B	MH316	BLK202N							0.33				0.61	3.11	10.88	0.76	11.64	73.59	99.78	116.94	170.92		309.90				309.90	313.81	49.32	600			0.24	1.075	3.91	1.25%
Pimiwidon Street		BULK202N	MH202											0.00	3.11	11.64	0.24	11.88	71.03	96.26	112.79	164.83		298.95				298.95	320.28	16.00	600			0.25	1.097	21.33	6.66%
Wigwas Street	S315, S315A-B, R315	MH315	MH314				0.41			0.31				1.13	1.13	10.00	0.98	10.98	76.81	104.19	122.14	178.56		117.46				117.46	142.86	73.50	375			0.61	1.253	25.40	17.78%
Wigwas Street	S314A-B	MH314	BULK203N							0.44				0.81	1.93	10.98	0.50	11.48	73.24	99.30	116.38	170.09		192.10				192.10	294.44	54.27	450			0.98	1.793	102.34	34.76%
Wigwas Street		BULK203N	MH203											0.00	1.93	11.48	0.18	11.66	71.55	96.97	113.63	166.06		187.59				187.59	247.07	16.00	450			0.69	1.505	59.47	24.07%
Moses Tennisco St	S313, R313	MH313	MH312				0.31			0.11				0.62	0.62	10.00	0.81	10.81	76.81	104.19	122.14	178.56		65.03				65.03	111.88	74.68	300			1.23	1.533	46.86	41.88%
Moses Tennisco St	S312A-C	MH312	BULK204N							0.45				0.83	1.45	10.81	0.37	11.18	73.82	100.09	117.31	171.46		145.11				145.11	400.16	54.25	450			1.81	2.437	255.05	63.74%
Park Block 7	P312	CBMH350	pipe	0.42										0.23	0.23	10.00	0.13	10.13	76.81	104.19	122.14	178.56		24.33				24.33	87.74	13.50	250			2.00	1.731	63.40	72.27%
Moses Tennisco St		BULK204N	MH204											0.00	1.68	11.18	0.11	11.29	72.54	98.34	115.24	168.43		165.53				165.53	400.16	16.00	450			1.81	2.437	234.63	58.63%
Michael Stoqua St	S311, S311A, R311	MH311	MH310				0.45			0.22				1.02	1.02	10.00	0.77	10.77	76.81	104.19	122.14	178.56		105.93				105.93	181.07	73.30	375			0.98	1.588	75.15	41.50%
Michael Stoqua St	S310A-B	MH310	BLK205N							0.37				0.68	1.70	10.77	0.56	11.33	73.97	100.30	117.55	171.82		170.06				170.06	270.97	55.30	450			0.83	1.651	100.92	37.24%
Michael Stoqua St		BLK205N	MH205											0.00	1.70	11.33	0.16	11.48	72.06	97.67	114.46	167.27		165.60				165.60	279.02	16.00	450			0.88	1.700	113.42	40.65%
Bareille-Snow St	S309, B309	MH309	MH308								0.10		1.24	2.95	2.95	10.00	0.72	10.72	76.81	104.19	122.14	178.56		307.62				307.62	385.95	74.54	525			0.74	1.727	78.33	20.30%
Bareille-Snow St	S308, S308A	MH308	BULK206N								0.25			0.49	3.44	10.72	0.34	11.06	74.15	100.54	117.84	172.24		345.75				345.75	517.42	47.21	525			1.33	2.315	171.67	33.18%
Bareille-Snow St		BULK206N	MH206											0.00	3.44	11.06	0.12	11.18	72.96	98.91	115.92	169.42		340.15				340.15	536.52	17.50	525			1.43	2.401	196.37	36.60%
Wanaki Road	B200, S200A	MH326	MH318								0.15		1.57	3.78	3.78	10.00	0.69	10.69	76.81	104.19	122.14	178.56		394.22				394.22	457.45	65.27	600			0.51	1.567	63.23	13.82%
Wanaki Road	S318	MH318	MH300								0.13			0.25	4.04	10.69	0.83	11.52	74.24	100.66	117.99	172.45		406.34				406.34	443.79	75.72	600			0.48	1.521	37.46	8.44%
Tawadina Road	S300, S300A	MH300	MH301								0.19			0.37	4.41	11.52	1.59	13.12	71.41	96.78	113.41	165.73		426.43				426.43	438.47	113.36	675			0.25	1.187	12.03	2.74%
Tawadina Road	S301, S301A	MH301	MH302								0.17			0.33	4.74	13.12	0.88	14.00	66.60	90.18	105.65	154.34		427.21				427.21	769.51	110.30	675			0.77	2.083	342.29	44.48%
Tawadina Road	S302, S302A	MH302	MH303								0.28			0.54	5.28	14.00	0.69	14.69	64.24	86.94	101.83	148.73		459.22				459.22	996.00	111.13	675			1.29	2.696	536.79	53.89%
Tawadina Road	S303	MH303	MH304								0.18			0.35	5.63	14.69	1.62	16.30	62.52	84.59	99.06	144.67		476.43				476.43	556.99	118.58	750			0.23	1.221	80.57	14.46%
Tawadina Road	S304, S304A	MH304	MH305								0.23			0.45	6.08	16.30	1.51	17.82	58.85	79.57	93.16	136.02		483.78				483.78	603.49	120.08	750			0.27	1.323	119.71	19.84%
Codd's Road	S340, B340, B340A	MH305	MH231								0.17		2.02	4.82	10.90	17.82	0.50	18.32	55.83	75.44	88.31	128.90		822.55				822.55	1,308.85	86.40	750			1.27	2.870	486.29	37.15%
Codd's Road	S231	MH231	MH176								0.12			0.23	11.14	18.32	0.43	18.75	54.91	74.17	86.82	126.71		826.06				826.06	1,240.05	70.90	750			1.14	2.719	413.99	33.38%
Block 1	-	DICB1	Pipe	1.05										0.58	0.58	61.68	0.20	61.88	24.06	32.28	37.67	54.75				31.97		31.97	62.04	14.59	250			1.00	1.224	30.07	48.47%
Block 11	-	DICB3	Pipe	1.24										0.69	0.69	81.62	0.19	81.81	19.53	26.16	30.52	44.31				30.55		30.55	62.04	13.63	250			1.00	1.224	31.49	50.76%
Block 12	-	DICB4	Pipe	1.24										0.69	0.69	80.96	0.23	81.19	19.65	26.32	30.70	44.58				30.74		30.74	60.47	16.78	250			0.95	1.193	29.73	49.17%
Block 8	-	DICB5	Pipe	0.66										0.37	0.37	28.47	0.15	28.62	41.47	55.87	65.32	95.20				34.93		34.93	62.04	11.20	250			1.00	1.224	27.11	43.69%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: KH
Checked: JIM
Dwg. Reference: 118863-500

No.	Revision	Date
1	Submission No. 1 for City Review	2018-12-20
2	Submission No. 2 for City Review	2019-03-15
3	MECP Submission	2019-04-17
4	Record Information Added (No.1)	2020-10-08
5	Record Information Added (No.2)	2021-03-31

File Reference:	Date:	Sheet No:
118863.5.7.1	2021-03-31	1 of 1

Formulas and Descriptions

i_{2yr} = 1:2 year Intensity = 732.951 / $(T_c+6.199)^{0.810}$
i_{5yr} = 1:5 year Intensity = 998.071 / $(T_c+6.053)^{0.814}$
i_{100yr} = 1:100 year Intensity = 1735.688 / $(T_c+6.014)^{0.820}$
T_c = Time of Concentration (min)
C = Average Runoff Coefficient
A = Area (Ha)
Q = Flow = 2.78CiA (L/s)

Maximum Allowable Release Rate

Restricted Flowrate ($Q_{restricted}$ = 2.78*C*i_{5yr} *A_{site} based on C=0.50, Tc=20min)

Based on Wateridge Village report

$Q_{restricted}$ =	195.00 L/s

Uncontrolled Release ($Q_{uncontrolled}$ = 2.78*C*i_{100yr} *$A_{uncontrolled}$)

C =	0.725	(0.58 x 1.25 for 100 year)
T_c =	10	min
i_{100yr} =	178.56	mm/hr
$A_{uncontrolled}$ =	0.14	Ha

$Q_{uncontrolled}$ =	50.38 L/s

Maximum Allowable Release Rate ($Q_{max\ allowable}$ = $Q_{restricted}$ - $Q_{uncontrolled}$)

$Q_{max\ allowable}$ =	144.62 L/s

SWM Statistics of Modified Site Areas		
Controlled	**Area**	**ICD Flow**
SC3	0.570	144.000
Sum	**0.57**	**144.00**
Uncontrolled	**Area**	**Flow**
SC1	0.050	0.98
SC2	0.090	1.76
Sum	**0.14**	**50.38**
Total Sum	**0.710**	**194.384**
Allowable		**195.00**
		TRUE

MODIFIED RATIONAL METHOD (100-Year, 5-Year & 2-Year Ponding)

Drainage Area	***SC3***		
Area (Ha)	0.570	Restricted Flow ICD $_{Actual}$ (L/s)=	144.00
C =	0.99	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	72.00

50% reduction for sub-surface storage

100-Year Ponding						**100-Year +20% Ponding**		
T_c Variable (min)	***i_{100yr} (mm/hour)***	***Peak Flow Q_p =2.78xCi $_{100yr}$ A (L/s)***	***Q_r (L/s)***	***Q_p -Q_r (L/s)***	***Volume 100yr (m^3)***	***100YRQ $_p$ 20% (L/s)***	***Qp - Qr (L/s)***	***Volume 100+20 (m^3)***
9	188.25	294.58	72.00	222.58	120.19			
14	148.72	232.72	72.00	160.72	135.01			
19	123.87	193.83	72.00	121.83	**138.88**	232.59	160.59	**183.08**
24	106.68	166.93	72.00	94.93	136.69			
29	94.01	147.11	72.00	75.11	130.70			

Storage (m^3) | 100+20

Overflow	**Required**	**Surface**	**Sub-surface**	**Balance**	**Overflow**	**Required**	**Balance**
0.00	138.88	0.00	140	0.00	0.00	183.08	43.08
						convert to flow with peak Tc (L/s)	37.79

overflows to: off site

Drainage Area	***SC3***		
Area (Ha)	0.570		
C =	0.72	Restricted Flow Q_r (L/s)=	72.00

2-Year Ponding					
T_c Variable (min)	***i_{2yr} (mm/hour)***	***Peak Flow Q_p =2.78xCi $_{2yr}$ A (L/s)***	***Q_r (L/s)***	***Q_p -Q_r (L/s)***	***Volume 2yr (m^3)***
3	121.46	138.58	72.00	66.58	11.98
4	111.72	127.47	72.00	55.47	13.31
5	103.57	118.17	72.00	46.17	**13.85**
6	96.64	110.26	72.00	38.26	13.77
7	90.66	103.44	72.00	31.44	13.20

Storage (m^3)

Overflow	**Required**	**Surface**	**Sub-surface**	**Balance**
0.00	13.85	0.00	140	0.00

overflows to: off site

Orifice coefficients	
Cv =	0.60

							Theoretical		Recommended	
	Invert	Diameter	Centre ICD	Max. Pond Elevation	Hydraulic Slope	Target Flow	Orifice	Actual Flow	Orifice	Actual Flow
	(m)	(mm)	(m)	(m)	(m)	(l/s)	(m)	(l/s)	(m)	(l/s)
STM MH1	86.86	300	87.010	89.010	2.000	144.00	0.1958	144.09	0.195	142.92
						144.00				**142.92**

ARCADIS
IBI GROUP

ARCADIS IBI GROUP
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
ibigroup.com

RUN-OFF COEFFICIENTS
Development Name | Name of Client/Developer
142609-6.0 | Rev #1 | 2023-06-29
Prepared By: AC | Checked By: JIM

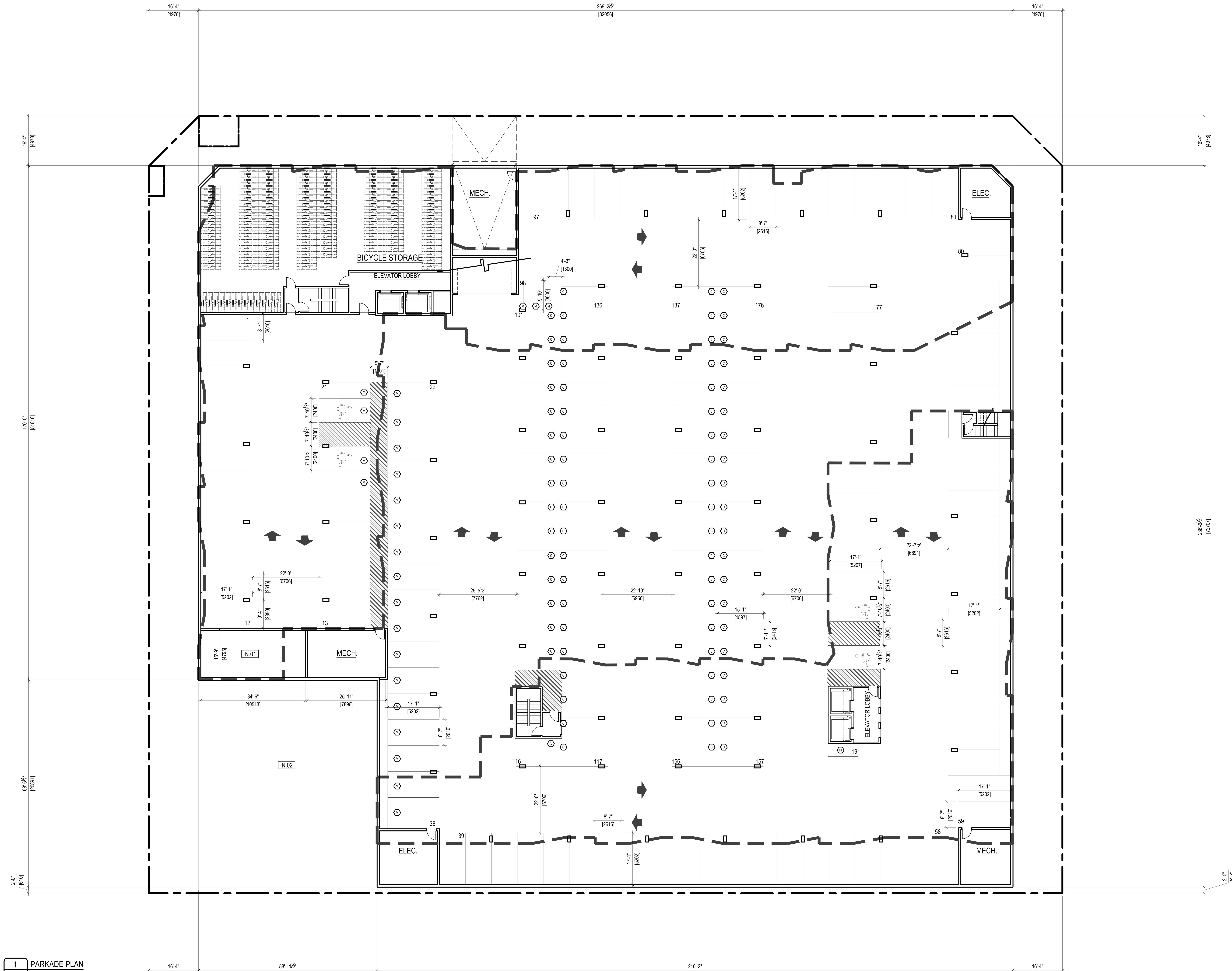
	SC1			SC2			SC3		
	GRASS	ROOF	ASPHALT	GRASS	ROOF	ASPHALT	GRASS	ROOF	ASPHALT
	202.32		307.68	432.72		467.28	1016.76		4763.24
TOTAL (m^2)	202.32	0.00	307.68	432.72	0.00	467.28	1016.76	0.00	4763.24
	510.00			900.00			5780.00		
Runoff Coefficient (C) :	0.2	0.9	0.9	0.2	0.9	0.9	0.2	0.9	0.9
Ave. Runoff Coefficient (C):	0.62			0.56			0.78		
Runoff Coefficient Used(C):	**0.62**			**0.56**			**0.79**		

Table 2.1 Hydrological Parameters

Block	Phase 2B Design Brief							Current Evaluation							
	Drainage Area ID	Area (ha)	Major System: D/S Segment ID	Minor System: MH ID	IMP Ratio	Segment Length (m)	Sub-catchment Width (m)	Parcel	Drainage Area ID	Area (ha)	Major System: D/S Segment ID	Minor System: MH ID	IMP Ratio	Segment Length (m)	Sub-catchment Width (m)
11	B309	1.24	S308A on Bareille-Snow	MH309 on Bareille-Snow	0.86	135.1	270.2	1	B309_1	0.72	S308 on Bareille-Snow	MH309 on Bareille-Snow	0.86	81	162
								2	B309_2	0.52	S308A on Bareille-Snow	MH310 on Michael Stoqua	0.86	58.5	117
12	B340	1.24	S207 on Hemlock	MH305 on Codd's Road	0.86	173.1	346.3	3	B340_3	0.34	S308A on Bareille-Snow	MH308 on Bareille-Snow	0.86	38.25	76.5
								4	B340_4	0.53	S308 on Bareille-Snow	MH309 on Bareille-Snow	0.86	59.63	119.25
								5	B340_5	0.37	S340 on Codd's	MH305 on Codd's Road	0.86	41.63	83.25

Table 2.2 Minor System Restriction and On-site Storage

Block	Phase 2B Design Brief				Current Evaluation					
	Drainage Area ID	Minor System Capture		Required On-Site Storage (cu-m)	Parcel	Drainage Area ID	Minor System Capture		Major System	
		Simulated Flow (l/s)	Corresponding Design Storm				Simulated Flow (l/s)	Corresponding Design Storm	Required On-Site Storage (cu-m)	Comment
11	B309	370	Between 5 and 100	None	1	B309_1	195	Between 5 and 100 year	43	Control up to the 100 year event
					2	B309_2	105	5 year	64	Control up to the 100 year event
12	B340	366	Between 5 and 100	None	3	B340_3	95	Between 5 and 100 year	18	Control up to the 100 year event
					4	B340_4	150	Between 5 and 100 year	21	Control up to the 100 year event
					5	B340_5	139	100 year	None	N/A



1 PARKADE PLAN
DP.P01 1/16" - 1'-0"

FAAS

FORMED ALLIANCE ARCHITECTURE STUDIO

SHEET NOTES

N.01 STORM WATER TANK BELOW RAMP (STORAGE VOLUME REQUIRED 140m3 REFER TO CIVIL).

N.02 INFILTRATION TANK LOCATION (REFER TO CIVIL)

LEGEND

- V VISITOR
- C COMPACT
- M MOTORCYCLE
- BARRIER FREE

PROJECT TEAM

ARCHITECT
FAAS ARCHITECTURE
BROGAN GORDON-COOPER
403.923.5072

PLANNING
Q9 PLANNING & DESIGN
CHRISTINE McCUAIG
613.850.8345

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CSW LANDSCAPE ARCHITECTS LTD.
JERRY CORUSH
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IBI GROUP
BEN PASCOLO-NEVEU
613.225.1311 ext.64074

ENVIRONMENTAL
ENGLOBE
ANDREW NAOUM
613.294.2280

RELEASES

NO.	DESCRIPTION	DATE
03	SPC RESPONSE (DRAFT)	01.19.24
02	ISSUED FOR SPC	02.28.23
01	ISSUED FOR CLC	10.24.22

PROJECT NAME

1050 TAWADINA RD
WATERIDGE

MUNICIPAL ADDRESS

1050 TAWADINA RD
OTTAWA, ON

LEGAL ADDRESS

PART OF BLOCK 11
REGISTERED PLAN 4M-1651
CITY OF OTTAWA
ANNIS, O'SULLIVAN, VOLLEBEKK LTD. 2022

PROJECT NO.

22.01.W.U.

DRAWN	CHECKED
LB	JA

DATE	SCALE
24.01.19	AS NOTED

DRAWING TITLE

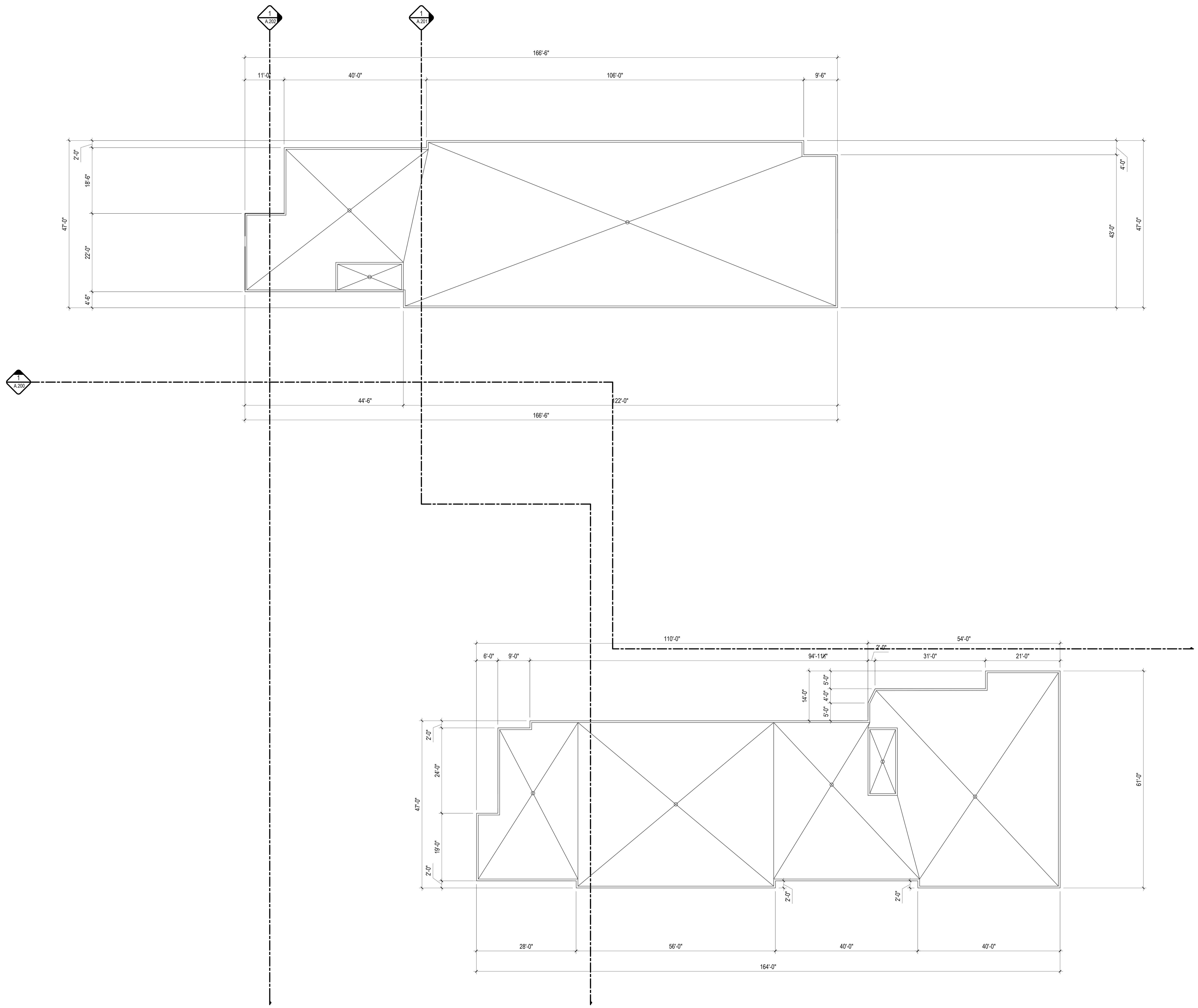
PARKADE PLAN

DRAWING NUMBER

SPC.P01

D07-12-23-0023

#18332



1 DP.110 LEVEL 09 ROOFPLAN
1/16" - 1'-0"

FAAS

FORMED ALLIANCE ARCHITECTURE STUDIO

SHEET NOTES

N.01 *CIVIL TO PROVIDE ADEQUATE ROOF DRAINS @ TOP ROOF OF BUILDING. ARCH CANNOT COORDINATE LOCATION WITHOUT PLACEMENT OF MECH. EQUIPMENT

PROJECT TEAM

ARCHITECT
FAAS ARCHITECTURE
BROGAN GORDON-COOPER
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RELEASES

NO.	DESCRIPTION	DATE
03	SPC RESPONSE (DRAFT)	01.19.24
02	ISSUED FOR SPC	02.28.23
01	ISSUED FOR CLC	10.24.22

PROJECT NAME

1050 TAWADINA RD
WATERIDGE

MUNICIPAL ADDRESS

1050 TAWADINA RD
OTTAWA, ON

LEGAL ADDRESS

PART OF BLOCK 11
REGISTERED PLAN 4M-1651
CITY OF OTTAWA
ANNIS, O'SULLIVAN, VOLLEBEKK LTD. 2022

PROJECT NO.

22.01.W.U.

DRAWN: LB
CHECKED: JA

DATE: 24.01.19
SCALE: AS NOTED

DRAWING TITLE

LEVEL 09 ROOFPLAN

DRAWING NUMBER

SPC.110

D07-12-23-0023

#18332

GWAL
Goodkey Weedmark & Associates Ltd.

Principal, Partners & Associates
F.W.A. Bann, P.Eng.
R.Lefebvre, P.Eng. LEED® AP
D.R. Vyas, P.Eng., MIEEE
S. Hamilton, P.Eng.
J. Moffat, P.Eng.
E. Pérusse, P.Eng., ing.
R. Boivin, P.Eng., ing.
R. Leonard, P.Eng.
M. Sarasin, P.Eng.

Executive Consultant
A. Bogdanowicz, P.Eng.
M.G. Carrière, C.E.T.
R. McIntyre, P.Eng.

March 28, 2024

Arcadis Professional Services (Canada) Inc.
333 Preston Street, Suite 500
Ottawa, ON
K1S 5N4

ATTENTION: SAMANTHA LABADIE, P.ENG., CIVIL ENGINEER

SUBJECT: 1050 TAWADINA RD. - NEW APARTMENT BUILDING
GWAL PROJECT NO. 2023-437

<u>Site Plan Control Agreement Comments:</u>

Please find herewith response based on the City of Ottawa's Site Plan Control Agreement comments for the above-mentioned project.

Item 15: The site has two main domestic water supply connections, which will be connected in the parking level.

Item 17: The area drains AD1-AD5 will be drained by gravity in the parking levels into the underground cistern.

We trust the above is satisfactory.

Yours very truly,

GOODKEY, WEEDMARK & ASSOCIATES LTD.

Mark Sarasin, P.Eng. | Senior Associate, Senior Mechanical Engineer

MS/nh

e.c.: Teresa Priel (WestUrban Developments Ltd.)
Philip Russo (WestUrban Developments Ltd.)
Mark Sarasin (GWAL - Mechanical)
Xiangyu Cai (GWAL - Mechanical)
Chris Leblanc (GWAL - Mechanical)
Divyakant (Raj) Vyas (GWAL - Electrical)
Liaqat Ali (GWAL - Electrical)
Roger Lavictoire (GWAL - Electrical)

Labadie, Sam

From: Christine McCuaig <christine@q9planning.com>
Sent: Wednesday, April 3, 2024 9:41 AM
To: Labadie, Sam
Subject: Fwd: Wateridge Project - 1050 Tawadina
Attachments: RE: Wateridge Project - 1050 Tawadina.eml; 221-00473-00_C_B1-C102.pdf

Hey Sam,

See below and attached

Thanks
Christine

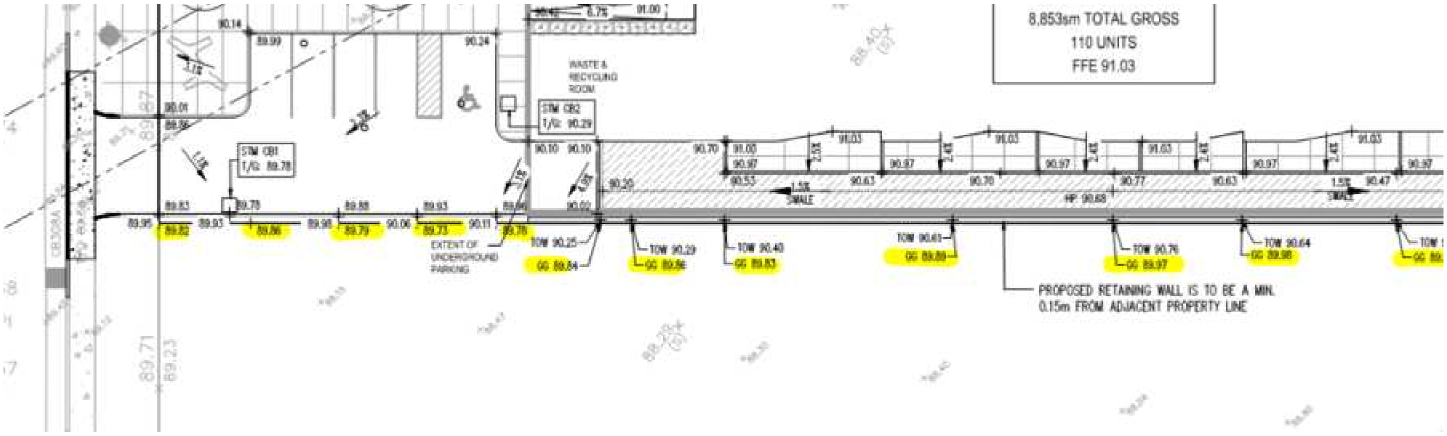
Christine McCuaig, RPP MCIP M.Pl
c. 613-850-8345

---------- Forwarded message ---------
From: **Jafferjee, Ishaque** <Ishaque.Jafferjee@wsp.com>
Date: Mon, Apr 1, 2024 at 1:55 PM
Subject: RE: Wateridge Project - 1050 Tawadina
To: Rod Price <rod@demarcoconstruction.ca>, Christine McCuaig <christine@q9planning.com>
Cc: Yang, Winston <Winston.Yang@wsp.com>, Ali, Zarak <Zarak.Ali@wsp.com>

Christine,

We will require to modify our grading elevations on the north side to align with the grass grades proposed on the your development highlighted in yellow (see the snippet below). As per Winston's email (attached), these adjustments will not be an issue and should not affect the slopes towards our sidewalk. Our current grading plan C-102 is attached (note grades are not modified on this yet).

I hope this clarifies.



Ishaque Jafferjee

Manager

Land Development & Municipal Engineering, Ontario

P.Eng.

T+ 1 613-829-2800

T+ 1 613-690-3923 (Direct)

M+ 1 613-716-5352

WSP Canada Inc.

2611 Queensview Drive, Suite 300

Ottawa, Ontario,

K2B 8K2 Canada

wsp.com

From: Rod Price <rod@demarcoconstruction.ca>
Sent: Monday, April 1, 2024 11:38 AM
To: Christine McCuaig <christine@q9planning.com>
Cc: Yang, Winston <Winston.Yang@wsp.com>; Jafferjee, Ishaque <Ishaque.Jafferjee@wsp.com>
Subject: Re: Wateridge Project - 1050 Tawadina

Hi again Christine,

I forgot that Winston starts paternity leave today for a month. I'm cc'ing Ishaque to help coordinate.

Thanks,

Rod

Rod Price,

Vice President/General Manager

195 Menten Place, Unit 103

Ottawa, ON.

K2H 9C1

Tel: 613-829-2777 Fax: 613-829-0778 C: 613-323-2146

Email: rod@demarcoconstruction.ca

From: Rod Price <rod@demarcoconstruction.ca>
Sent: Monday, April 1, 2024 11:27 AM
To: Christine McCuaig <christine@q9planning.com>
Cc: Yang, Winston <Winston.Yang@wsp.com>
Subject: Re: Wateridge Project - 1050 Tawadina

Hi Christine,

I hope all is well and you had a great weekend. I'm connecting you with Winston Yang from WSP. Winston is our civil engineer and he can provide our latest grading plan for your team as well. We both need sign off so I'd like to make sure things are coordinated appropriately. I don't believe we have any real issues with the plan you provided.

Thanks,

Rod

Rod Price,

Vice President/General Manager

DEMARCO CONSTRUCTION

195 Menten Place, Unit 103

Ottawa, ON.

K2H 9C1

Tel: 613-829-2777 Fax: 613-829-0778 C: 613-323-2146

Email: rod@demarcoconstruction.ca

From: Christine McCuaig <christine@q9planning.com>
Sent: Thursday, March 28, 2024 8:00 AM
To: Rod Price <rod@demarcoconstruction.ca>
Subject: Wateridge Project - 1050 Tawadina

Hi Rod,

I am not sure if we've met in passing over the years but I do recognize your name. The City asked us to reach out to you as our developing neighbour to the south of our project at 1050 Tawadina.

Specifically, they wanted to ensure that you have reviewed our grading plan and have no issues with it. Honestly, I am not sure why they are asking. We have a retaining wall and it is proposed on our side of the property line. I have attached the grading plan in any event and happy to answer questions but if you have no issues, please feel free to send me a response to that effect so I can relay to staff.

Thx

Christine

Christine McCuaig, RPP MCIP M.PI

Principal Senior Planner & Project Manager

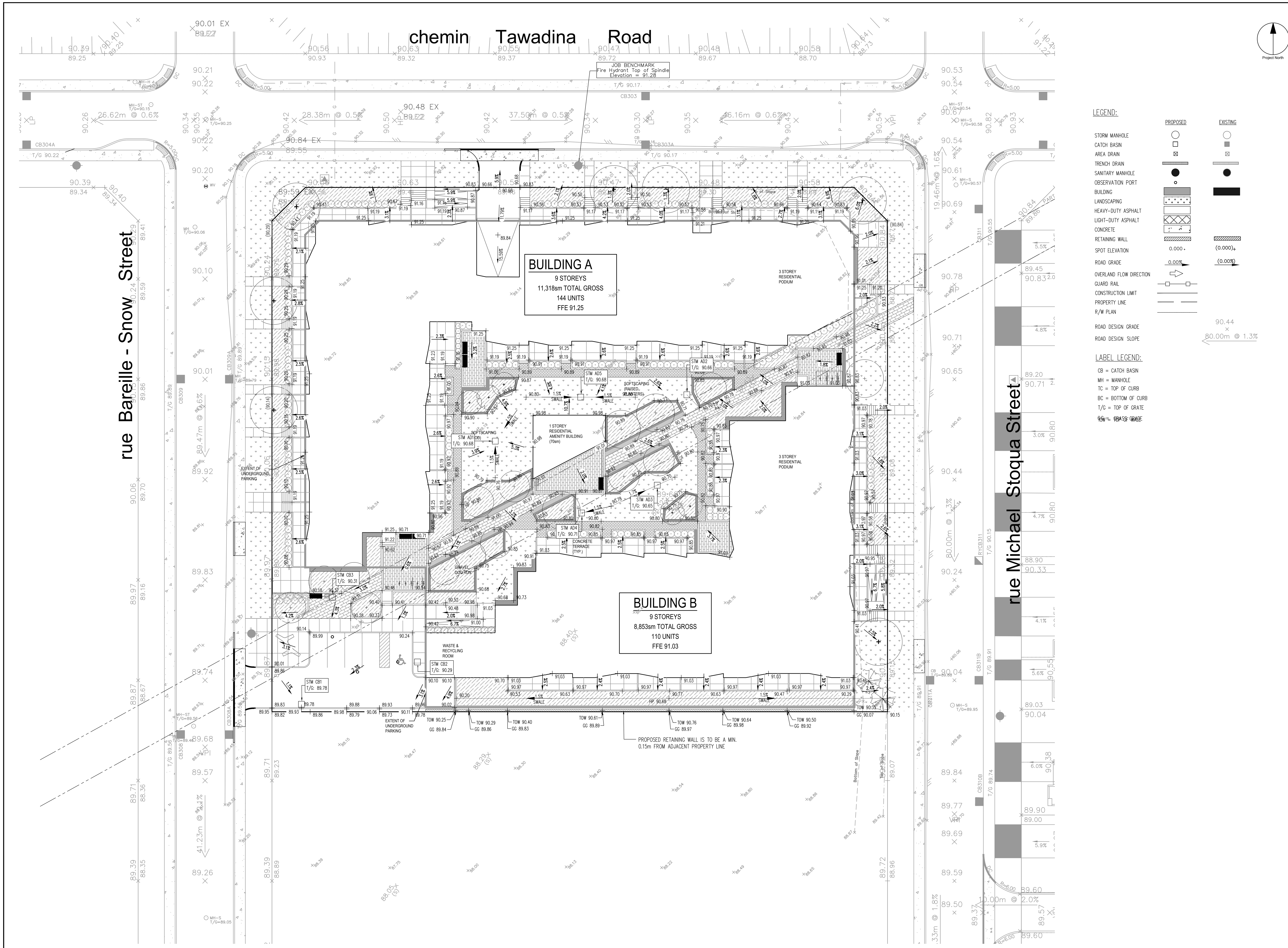
613-850-8345

Q9 Planning & Design

-LAEmHhHzdJzBITWfa4Hgs7pbKl

APPENDIX E

142609-900 – Site Erosion and Sediment Control Plan
142609-200 – Site Grading Plan



CLIENT

WestUrban Developments Ltd.

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ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CLC SUBMISSION	2023-01-11
2	SUBMISSION NO.2 FOR CITY REVIEW	2023-09-13
3	SUBMISSION NO.3 FOR CITY REVIEW	2023-12-20
4	UPDATED FILE NUMBER	2024-04-03
5		
6		
7		
8		

KEY PLAN

1:250

SEAL

LICENSED PROFESSIONAL ENGINEER
A. CHETRAR
100528180
2024/04/03
PROVINCE OF ONTARIO

ARCADIS

333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT

1050 Tawadina Road

WATERIDGE VILLAGE PHASE 2

PROJECT NO: 142609	
DRAWN BY: M.M.	CHECKED BY: J.I.M.
PROJECT MGR: S.L.	APPROVED BY: A.C.

SHEET TITLE

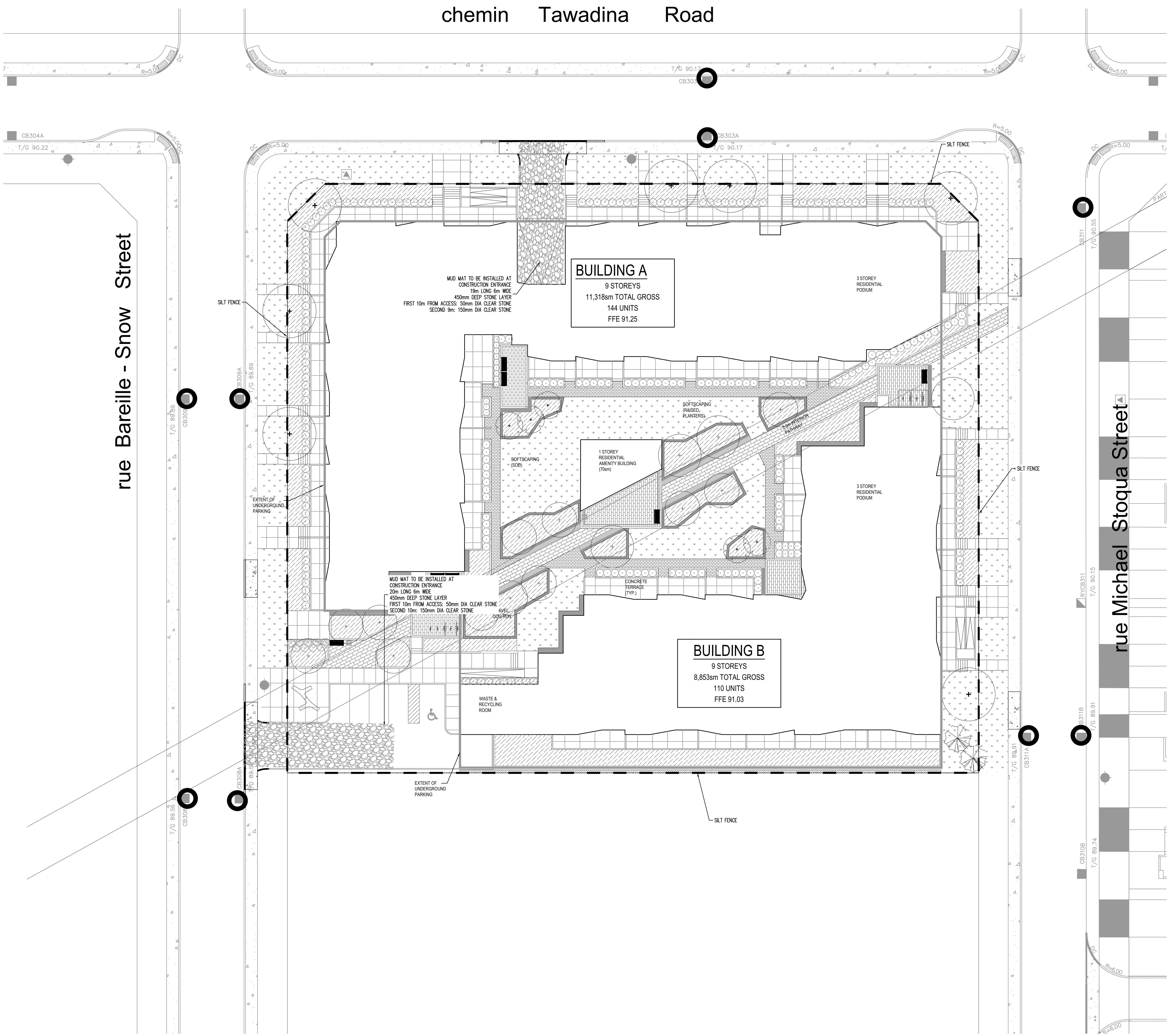
SITE GRADING PLAN

SHEET NUMBER C-200

ISSUE 4

CITY PLAN No. 18977

CITY FILE No. D07-12-23-0023



Project North

LEGEND:

	PROPOSED	EXISTING
STORM SEWER		
WATER LINE		
SANITARY SEWER		
PIPE FLOW DIRECTION		
STORM MANHOLE		
AREA DRAIN		
CATCH BASIN		
DOUBLE CATCH BASIN		
TRENCH DRAIN		
PIPE INSULATION		
SANITARY MANHOLE		
WATER HYDRANT		
WATER VALVE		
90° BEND		
45° BEND		
TEE FITTING		
PIPE CROSSING NUMBER		
BUILDING		
RETAINING WALL		
CONSTRUCTION LIMIT		
PROPERTY LINE		
R/W PLAN		

LABEL LEGEND:

T/G = TOP OF GRATE
CB = CATCH BASIN
DCB = DOUBLE CATCH BASIN
MH = MANHOLE
AD = AREA DRAIN

LEGEND:

SILT FENCING
CB INLET PROTECTION REQUIRED
MUD MAT

NOTES:

1. IT IS THE RESPONSIBILITY OF THE APPLICANT/CONSULTANT TO ENSURE COMPLIANCE WITH ALL APPLICABLE PROVINCIAL STANDARDS AND TO OBTAIN ALL PROVINCIAL APPROVALS, INCLUDING BUT NOT LIMITED ENVIRONMENTAL COMPLIANCE APPROVALS.
2. EROSION AND SEDIMENT CONTROL (ESC) MEASURES WILL BE IMPLEMENTED PRIOR TO, AND MAINTAINED, DURING CONSTRUCTION PHASES TO PREVENT ENTRY OF SEDIMENT INTO THE WATER. ALL DAMAGED ESC MEASURES SHOULD BE REPAIRED AND/OR REPLACED WITHIN 48 HOURS OF INSPECTION.
3. ALL DISTURBED AREAS WILL BE MINIMIZED TO THE EXTENT POSSIBLE AND TEMPORARILY OR PERMANENTLY STABILIZED OR RESTORED AS WORK PROGRESSES.
4. THE ESC STRATEGIES OUTLINED IN THE REPORTS AND IN THESE NOTES ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO MINIMIZE SEDIMENT LADEN RUNOFF FROM LEAVING THE WORK AREA. IF THE PRESCRIBED MEASURES IN THE REPORTS AND NOTES ARE NOT EFFECTIVE IN PREVENTING THE RELEASE OF DELETERIOUS SUBSTANCE, THEN ALTERNATIVE MEASURES MUST BE IMPLEMENTED IMMEDIATELY TO MINIMIZE POTENTIAL ECOLOGICAL IMPACTS AND A TORONTO REGION CONSERVATION AUTHORITY ENFORCEMENT OFFICE SHOULD BE IMMEDIATELY CONTACTED. ADDITIONAL ESC MEASURES TO BE KEPT ON SITE AND USED AS NECESSARY.
5. ALL ACTIVITIES, INCLUDING MAINTENANCE PROCEDURES, WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE, OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER. VEHICULAR REFUELING AND MAINTENANCE WILL BE CONDUCTED A MINIMUM OF 30m FROM ANY ONSITE WATER BODY OR DRAINAGE WAY.
6. FILTER FABRIC TO BE PLACED UNDER GRATES ON ALL CATCH BASINS SURROUNDING THE SITE, TO TRAP SEDIMENT. SILT TRAPS ARE TO BE CLEANED REGULARLY AND ARE NOT TO BE REMOVED UNTIL SUCH TIME AS THE CONSTRUCTION IS COMPLETE AND THE LANDSCAPING IS GRADED AND SODDED. FILTER FABRIC FOR SILT CONTROL TO BE TERRA FIX 270R OR APPROVED EQUIVALENT.
7. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL MEET THE REQUIREMENTS SET OUT IN OPSS 804, OPSS 805, CITY OF OTTAWA CONSTRUCTION SPECIFICATION 01 57 13, CITY OF OTTAWA STANDARD SPECIFICATION SP F-1004 AND CITY OF OTTAWA STANDARD SPECIFICATION SP F-804.

CLIENT

WestUrban Developments Ltd.

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CLC SUBMISSION	2023-01-11
2	SUBMISSION NO.2 FOR CITY REVIEW	2023-09-13
3	SUBMISSION NO.3 FOR CITY REVIEW	2023-12-20
4	UPDATED FILE NUMBER	2024-04-03
5		
6		
7		
8		

KEY PLAN

1:250 0 2.5 7.5 12.5m

SEAL

LICENSED PROFESSIONAL ENGINEER
A. CHETRAR
100528180
2024/04/03
PROVINCE OF ONTARIO

File Location: J:\142609_1050_Tawadin\7.0_Production\7.03_Design\04_Civil\Sheets\900.dwg Last Saved: December 18, 2023, by MMilne Plotted: Wednesday, April 3, 2024 2:00:53 PM by Samantha Labadie

ARCADIS

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www.arcadis.com

PROJECT

1050 Tawadina Road

WATERIDGE VILLAGE PHASE 2

PROJECT NO: 142609	
DRAWN BY: M.M.	CHECKED BY: J.I.M.
PROJECT MGR: S.L.	APPROVED BY: A.C.

SHEET TITLE

SITE EROSION AND SEDIMENT CONTROL PLAN

SHEET NUMBER	ISSUE
C-900	4

CITY FILE No. D07-12-23-0023 CITY PLAN No. 18977